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LIST OF PAPERS.

PROCEEDINGS

OF THE

LINNEAN SOCIETY OF LONDON.

(SESSION 1869–70.)

November 4th, 1869.

George Bentham, Esq., President, in the Chair.

Charles Lambert Esq., was elected a Fellow.

The following Report, on the Additions to the Library since the last Report (Proceedings, 1868–69, p. xlv), was laid before the Meeting:—

The publications of Scientific Bodies received since the date of the last Report (May 6, 1869), have been the following:—

(Those marked with the asterisk (*) contain no paper on recent Zoology or Botany.)

DENMARK:—

Royal Danish Society of Sciences, Copenhagen. Transactions (Skrifter), Ser. 5, viii. parts 1 and 2. Proceedings (Oversigt over Forhandlinger), 1867, n. 6 and 7; 1868, n. 1 to 4; 1869, n. 1.

Botanical Society of Copenhagen. Botanical Journal (Tidsskrift), ii. parts 1 to 4, iii. part 1. Purchased.

Russia :—

Imperial Academy of Sciences, St. Petersburg. Memoirs, Ser. 7, xii. n. 4, 5, xiii. n. 1 to 7; Bulletin, xiii. n. 4, 5.

Entomological Society of Russia, St. Petersburg. Journal (Horæ), vi. part 2.

Imperial Society of Naturalists, Moscow. Bulletin, 1868 ii. n. 3.

Germany :—

Royal Academy of Sciences, Berlin. *Transactions (Abhandlungen), 1868; Proceedings (Monatsberichte), 1869, March to June.

Imperial Academy of Sciences, Vienna. Proceedings (Sitzungsberichte): *Physical Division, lvii. n. 4, 5, lviii. n. 1; Natural-History Division, lvii. n. 4, 5. *Minutes of Proceedings (Sitzungsberichte), 1869, n. 12 to 19.

Imperial and Royal Geological Institute of Vienna. *Journal (Jahrbuch), xix. n. 1; *Proceedings (Verhandlungen), 1869, n. 1.

Royal Bavarian Acadamy of Sciences, Munich. Transactions of the Mathematico-Physical Class (Abhandlungen), x. part 2. *Proceedings (Sitzungsberichte), 1869, i. n. 1 to 3. C. F. Meissner's Obituary Notice of C. F. Ph. v. Martius. A. Vogel's Address on the Development of Agricultural Chemistry.

Natural-History Association of Brünn. Transactions (Verhandlungen), vi. (1867).

Upper-Hessian Society of Natural History and Medical Science, Giessen. Report, xiii. 1869.

Natural-History Association of Rhenish Prussia, Bonn. Transactions (Verhandlungen), xxv.

Italy :—

Royal Institute of Venice. Memoirs, xiv. n. 1 and 2; Proceedings (Atti), xii. n. 10, xiii. n. 1 to 10, xiv. n. 1 to 5.

Royal Technical Institute of Palermo. Journal of Natural and Economical Sciences (Giornale), iv. n. 4, v. n. 1, 2.

Switzerland :—

Society of Physics and Natural History, Geneva. Memoirs, xx.

"Société Vaudoise" of Natural Sciences, Lausanne. Bulletin, x. n. 61.

Natural-History Society of Zurich. Quarterly Journal (Vierteljahrsschrift), iii. 1858, 2 parts, v. 1860, 4 parts (to complete our set), xii. 1867, xiii. 1868.

Naturalists' Society of Basle. Transactions (Verhandlungen), v. n. 2.

France:—

Botanical Society of France, Paris. Bulletin, xv, Proceedings (Comptes rendus), n. 2, and, Extraordinary Meeting; xvi, Proceedings, n. 1 to 3; *Bibliographical Review, A to C.

Imperial Society of Agriculture, Lyons. Annals of Physical and Natural Sciences, Ser. 3, xi.

Society of Physical and Natural Sciences, Bordeaux. *Minutes of Proceedings (Procès-verbaux), March to May, 1869.

India:—

Asiatic Society of Bengal. Journal, New Series: *History, xxxix. n. 2; Physical Science, xxxviii. n. 2, 3. *Proceedings, 1869, n. 2 to 7.

East-India Association. *Journal, iii. n. 2.

Royal Natural-History Society for Netherlands-India, Batavia. Journal of Natural Science for Netherlands-India (Tijdschrift), xxx.

Australia:—

Adelaide Philosophical Society. Report and Transactions for 1868.

South America:—

Society of Physical and Natural Science, Caraccas. Vargasia, n. 5.

North America:—

Smithsonian Institution, Washington. Annual Report for 1867.

National Academy of Sciences, Washington. *Report of Operations for 1866 and 1867.

American Entomological Society, Washington. Transactions, ii. n. 1, 2.

American Philosophical Society, Philadelphia. Transactions, New Ser. xiii. n. 3; *Proceedings, x. n. 78, 79, xi. n. 81.

Boston Society of Natural History. Occasional Papers, i.; Memoirs, i. n. 4; Proceedings, xii. to p. 272.

Museum of Comparative Zoology, Boston. Report for 1868, Bulletin n. 7.

American Academy of Arts and Sciences, Boston. Proceedings, vii. conclusion.

Essex Institute, Salem. Proceedings, v. n. 7, 8.

Peabody Academy of Sciences, Salem. Memoirs, i. n. 1; The American Naturalist, ii.

Lyceum of Natural History, New York. Annals, ix. n. 1 to 4.

Portland Society of Natural History. Proceedings, i. n. 1, 2.

BRITISH DOMINION :—

Canadian Institute, Toronto. *Canadian Journal of Science, Literature, and History, xii. n. 2, 3.

Natural-History Society of Montreal. The Canadian Naturalist, New Ser. iii. n. 5, 6.

Nova-Scotian Institute of Natural Science, Halifax. Proceedings and Transactions, ii. n. 2.

BRITAIN :—

Royal Society. Proceedings, xvii., xviii. n. 111 to 114.

Society of Arts. *Weekly Journal.

Entomological Society. Transactions, 1869, n. 2, 3, 4, and Ser. 3, iii. part 7.

Geological Society. *Quarterly Journal, xxv. n. 2, 3.

Linnean Society. Journal, Zoology, x. n. 46; Botany, xi. n. 50, 51, xii.

Pharmaceutical Society. *Journal and Transactions, Ser. 2, xi. 1 to 4.

Quekett Microscopical Club. Journal, i. n. 7, 8.

Ray Society. Masters, Vegetable Teratology.

Royal Agricultural Society. *Journal, Ser. 2, v. n. 2.

Royal Asiatic Society. *Journal, iv. n. 1.

Royal Geographical Society. *Journal, xxxviii; *Proceedings, xiii. n. 3, 4.

Royal Institution. Proceedings, v. n. 5, 6; *Report, 1869.

Royal Medical and Chirurgical Society. *Proceedings, vi. n. 3, 4.

Royal Microscopical Society. Monthly Microscopical Journal and Transactions, 1869, i. ii., May to October.

Zoological Society. Transactions, vi. n. 8. Proceedings, 1868 iii., 1869 i.

British Association for the Advancement of Science. Report of the Norwich Meeting, 1868.

Royal Dublin Society. Journal, v. n. 38.

Royal Geological Society of Ireland. *Journal, ii. n. 1.

Cambridge Philosophical Society. *Transactions, ii. n. 2. *Proceedings, 1868–9, n. 3 to 6.

Northumberland and Durham Natural-History Transactions, iii. n. 1.

Literary and Philosophical Society of Manchester. Memoirs, Ser. 3, iii.

Warwickshire Natural-History and Archæological Society. *Annual Report.

Cornwall Polytechnic Society. *Annual Report, 1868.

Bath Natural-History and Antiquarian Field Club. Proceedings, 1867–69.

The Scientific Periodicals taken in by, or presented to, the Society, the current numbers of which are not specially enumerated in each successive Library Report, although their biological contents are included in the Analyses of Papers, are the following:—

General or Mixed Natural History:—

Annals and Magazine of Natural History, monthly. Presented by Dr. Francis.

Wiegmann's Archiv für Naturgeschichte, quarterly, or nearly so. Purchased.

Popular Science Review, quarterly. Presented by the Publisher.

Monthly Microscopical Journal. Presented by the Microscopical Society.

Zoology:—

Siebold and Kölliker's Zeitschrift für wissenschaftliche Zoologie. Purchased.

Annales des Sciences Naturelles, Zoologie, monthly, or nearly so. Purchased.

Zoologist, monthly. Purchased.

Ibis, quarterly. Purchased.

Entomologist's Monthly Magazine. Presented by the Editors.

Entomologist, monthly. Presented by the Editor.
Journal de Conchyliologie, quarterly. Purchased.
Malacozoologische Blätter. Purchased.

BOTANY:—

Pringsheim's Jahrbücher für wissenschaftliche Botanik, quarterly. Purchased.

Annales des Sciences Naturelles, Botanique, monthly, or nearly so. Purchased.

Linnæa, quarterly, or nearly so. Purchased.
Seemann, Journal of Botany, monthly. Purchased.
Botanische Zeitung, weekly. Purchased.
Flora, weekly. Purchased.
Botanical Magazine, monthly. Purchased.

HORTICULTURE:—

Illustration Horticole, monthly. Presented by the Publisher.
Gardeners' Chronicle, weekly. Purchased.

MISCELLANEOUS:—

London, Edinbugh, and Dublin Philosophical Magazine and Journal of Science, monthly. Presented by Dr. Francis.

Scientific Review. Presented by the Publisher.
Geological Magazine, monthly. Presented by the Editors.
Journal of the Society of Arts, weekly. Presented by the Society.
Pharmaceutical Society's Journal and Transactions, monthly. Presented by the Society.

Athenæum, weekly. Presented by the Publishers.

The Biological papers contained in the above Transactions, Proceedings, and Journals, and the separate works added to the Library since the last Report, are as follows:—

(This analytical enumeration is continued according to the plan adopted last year. The contents of all the publications received are analyzed, with the sole exception of the few journals confined either to Ornithology, Entomology, or Conchyliology, which, each time they are received, are entered only under their respective heads, without any detailed recapitulation of their contents. The short Memoranda on individual animals and plants observed in particular

districts, contained in the Zoologist, in some of the foreign botanical periodicals, in reports of field clubs, and in accounts of geological or botanical excursions, &c., are also passed over as being generally of purely local interest, and at the same time so numerous that they would have enormously extended these Reports without any corresponding advantage. Purely Medical, Agricultural, and Horticultural Papers are omitted, notwithstanding any remote connexion with Biology. Anatomical Papers are only inserted when they relate more or less to Animals or Mammalia generally and are not strictly confined to human anatomy. A heading has now been added for the Palæontological papers dispersed in the publications analyzed, in which, however, are not included those contained in Transactions and Journals exclusively devoted to Geology.)

MAMMALIA AND GENERAL ZOOLOGY:—

F. L. W. Bischoff. On the convolutions of the brain of Man, with reference to their development in the fœtus and to their arrangement in Monkeys, 7 plates. Trans. R. Acad. Munich, x.

W. T. Blanford. A new Hare from Abyssinia. Ann. Nat. Hist. Ser. 4, iv.

E. Blyth. Notice of two overlooked species of Antelope, woodcuts.—On the hybrid between the Chamois and the Domestic Goat. Proc. Zool. Soc. 1869, i.

E. Brandt. On the biting-apparatus of *Sorex*, 6 plates. Bull. Soc. Imp. Nat. Mosc. 1868, ii.

R. Brown. On the Pinnipedia of the Spitzberg and Greenland seas.—On the Cetacea of Davis's Straits and Baffin's Bay. Proc. Zool. Soc. 1868, iii.

N. Bubnoff. Various anatomical papers, chiefly human, but relating also in some measure to Mammalia, plates. Proc. Imp. Acad. Vienna, Nat. Hist. lvii.

A. Campbell. On the mode of capture of Elephants in Assam. Proc. Zool. Soc. 1869, i.

J. G. Cooper. The Fauna of Montana territory. Amer. Naturalist, ii.

L. J. Fitzinger. Critical researches on the natural family Sorices. Proc. Imp. Acad. Vienna, Nat. Hist. lvii.

W. H. Flower. On the value of the characters of the base of the cranium in the classification of Carnivora, woodcuts and diagram. Proc. Zool. Soc. 1869, i.

J. C. Galton. The myology of *Cyclothurus didactylus*, 1 plate. Ann. Nat. Hist. Ser. 4, iv.; also a separate copy presented by the author.

J. R. Gilpin. On the Mammalia of Nova Scotia. Trans. Nov. Scot. Inst. ii.

J. E. Gray. Notes on the fœtus of an Elephant, and of a Hippopotamus in the British Museum, woodcut.—On the skulls of Dogs, Wolves, and Foxes in the British Museum, woodcuts.—On the bottle-nosed Whales, woodcut. Proc. Zool. Soc. 1868, iii.

——. Additional notes on Sea-bears (Otariadæ).—On the development and change in the form of the horn of the Gnu (*Connochetes Gnu*).—Notes on Seals (Phocidæ) and the changes in the form of their lower jaw during growth. Ann. Nat. Hist. Ser. 4, iv.

A. H. Green. On the natural history and hunting of the Beaver, with notes by R. Brown. Journ. Linn. Soc. Zool. x.

W. J. Hays. The prong-horned Antelope, 1 plate. Amer. Naturalist, ii.

R. Hensel. Report on the contributions to the natural history of Mammalia for 1866. Wiegm. Archiv, xxxiii.

J. W. Hulke. On the blood-vessel system of the retina of the Hedgehog. Proc. R. Soc. xvii. Monthly Microsc. Journ. 1869.

— v. Krauss. On *Cholœpus didactylus*, Linn. Wiegm. Archiv, xxxv.

A. Macalister. On the myology of *Bradypus tridactylus*. Ann. Nat. Hist. Ser. 4, iv.

R. Mantegazza. Experimental researches on animal-grafting and the artificial production of cellules, 6 plates. Presented by Mr. Darwin.

J. Murie. On Eared Seals from the Falkland islands, 1 plate and woodcuts. Proc. Zool. Soc. 1869, i.

A. Murray. On the alleged occurrence of the Rhinoceros in Borneo. Proc. Zool. Soc. 1868, iii.

A. S. Packard, jun. The hairy Mammoth, 1 plate. Amer. Naturalist, ii.

W. C. H. Peters. New and little-known Bats, especially from the Paris Museum. Proc. R. Acad. Berlin, 1869.

R. A. Philippi. On some animals from Mendoza, 1 plate. Wiegm. Archiv, xxxv.

C. B. Radcliffe. Researches on animal Electricity. Proc. R. Soc. xvii.

L. Sabaneef. Materials for the fauna of the government of Jaroslav (continued). Bull. Soc. Imp. Nat. Mosc. 1868, ii.

H. de Saussure. On some Mexican Mammifera, 4 plates. (Separate copy from Rev. et Mag. Zool.) Presented by Sir John Lubbock.

P. L. Sclater. On the breeding of Mammals in the gardens of the Zoological Society during the past twenty years. Proc. Zool. Soc. 1868, iii.

S. J. Smith. The geographical distribution of Animals. Amer. Naturalist, ii.

J. Steenstrup. The character of the indigenous Icelandic terrestrial Mammalian fauna (from the Vidensk. Meddel. Nat. Hist. Soc. Copenhagen). Ann. Nat. Hist. Ser. 4, iii.

L. Stieda. Studies on the central nervous system of Birds and Mammals, 8 plates. Zeitschr. wiss. Zool. xix.

A. v. Winiwarter. On the anatomy of the ovarium in Mammalia, 1 plate. Proc. Imp. Acad. Vienna, Nat. Hist. lvii.

ORNITHOLOGY:—

The Ibis, v. n. 19 (July).

J. A. Allen. Notes on Birds observed in western Iowa. Mem. Bost. Soc. Nat. Hist. i.

A. D. Bartlett. Remarks on the habits of Hornbills. Proc. Zool. Soc. 1869, i.

W. T. Blanford. Ornithological notes, chiefly on Birds of Central, Western, and Southern India. Journ. Asiat. Soc. Bengal, xxxviii.

——. Five new Birds from Abyssinia. Ann. Nat. Hist. Ser. 4, iv.

H. Burmeister. Contributions to the Ornithology of the Argentine Republic and adjacent islands. Proc. Zool. Soc. 1868, iii.

J. G. Cooper. The fauna of Montana territory. Amer. Naturalist, ii.

E. D. Cope. The Birds of Palestine and Panama compared. Amer. Naturalist, ii.

E. Coues. Synopsis of the Birds of South Carolina. Proc. Bost. Soc. Nat. Hist. xii.

——. Catalogue of the North-American Birds in the museum of the Essex Institute. Proc. Essex Inst. v.

O. Finsch. On a very rare Parrot from the Solomon Islands, 1 plate. Proc. Zool. Soc. 1869, i.

F. A. Forel. On a false albinism of three young Swans. Bull. Soc. Vaud. Sc. Nat. x.

J. Gould. Five new Birds from Queensland.—*Ceryle Sharpii*, a new Kingfisher from the Gaboon. Ann. Nat. Hist. Ser. 4, iv.

D. Gunn. Notes of an egging expedition to Shoal Lake west of Lake Winnipeg. Rep. Smiths. Instit. 1867.

G. Hartlaub. Report on the contributions to the Natural History of Birds during the years 1866 and 1867. Wiegm. Archiv, xxxiii. xxxiv.

F. W. Hutton. On the mechanical principles involved in the sailing flight of the Albatros. Phil. Mag. xxxviii.

G. N. Lawrence. Catalogue of the Birds found in Costarica. Ann. Lyc. Nat. Hist. N. York, ix.

H. Lawson. The anatomical relation of the ciliary muscle in Birds, ½ plate. Monthly Microsc. Journ. ii.

L. Lombardini. On irregular organic forms in Birds and Batrachia, 8vo, 2 plates. Presented by Mr. Darwin.

J. Murie. On the presence and function of the gular pouch in *Otis Kori* and *O. australis*, 1 plate. Proc. Zool. Soc. 1868, iii.

——. On the sublingual aperture and sphincter of the gular pouch in *Otis tarda*, woodcut. Proc. Zool. Soc. 1869, i.

W. v. Nathusius. Additions to his paper on the coatings which cover the yolk of Birds' eggs (Proc. 1868–9, p. viii), 3 plates. Zeitschr. wiss. Zool. xix.

W. K. Parker. On the osteology of the Kagu (*Rhinochetus*), 2 plates. Trans. Zool. Soc. vi.

G. du Plessis and J. Combe. On the Birds of the district of Orbe. Bull. Soc. Vaud. Sc. Nat. x.

H. Reeks. Notes on Newfoundland Birds. Zoologist, 1869.

F. Salvadori. A new species of *Leucosticte*, 1 plate. Proc. Zool. Soc. 1868, iii.

P. L. Sclater. New or little-known species of Formicarians, 1 plate. Proc. Zool. Soc. 1868, iii.

——. On a collection of Birds from the Solomon Islands, 2 plates. —On the Birds of the vicinity of Lima, Peru, 1 plate. Proc. Zool. Soc. 1869, i.

P. L. Sclater and O. Salvin. Synopsis of American Rallidæ, 1 plate.—On Peruvian Birds collected by Mr. Whitely (continued).—On Venezuelan Birds collected by Mr. A. Goering (continued). Proc. Zool. Soc. 1868, iii.

—— ——. Notes on the species of *Asturina*.—On Peruvian Birds collected by Mr. Whitely (continued), 1 plate.—On Argentine Birds. Proc. Zool. Soc. 1869, i.

R. B. Sharpe. On the genus *Ceyx*. Proc. Zool. Soc. 1868, iii.

——. On the genus *Chætops*, 1 plate. Proc. Zool. Soc. 1869, i.

L. Stieda. Studies on the central nervous system of Birds and Mammals, 3 plates. Zeitschr. wiss. Zool. xix.

F. Sumichrast. The geographical distribution of the native Birds of the Department of Vera Cruz. Mem. Bost. Soc. Nat. Hist. i.

T. M. Trippe. The Warbler. Amer. Naturalist, ii.

ICHTHYOLOGY:—

F. Cortese. On an anomaly in the optical nerves of Fishes, 3 plates. Mem. R. Venet. Inst. xiv.

F. Day. Observations on Indian Fishes. Proc. Zool. Soc. 1868, iii.

J. B. Gilpin. On the food fishes of Nova Scotia. Trans. Nov. Scot. Inst. Nat. Sc. ii.

A. Günther. Two new Fishes discovered by Marquis Doria. Ann. Nat. Hist. Ser. 4, iii.

J. D. Macdonald. On *Gonostomyzus*, a new genus of Mugilidæ from the Feejee group, 1 plate. Proc. Zool. Soc. 1869, i.

Th. v. Siebold. On the acclimatization of Salmonidæ in Australia and New Zealand, with an appendix on the means of transport, 1 plate. Zeitschr. wiss. Zool. xix.

F. Steindachner. Icthyological report on a journey into Spain and Portugal (continued), 6 plates.—Ichthyological notes (continued), 5 plates. Proc. Imp. Acad. Sc. Vienna, Nat. Hist. lvii.

F. H. Troschel. Report on the contributions to Ichthyology in 1866. Wiegm. Archiv, xxxiii.

E. B. Truman. On the development of the ovum in the Pike, 2½ plates. Monthly Microsc. Journ. ii.

REPTILES AND BATRACHIA:—

J. A. Allen. Catalogue of Reptiles and Batrachians found in the vicinity of Springfield, Mass. Proc. Bost. Soc. Nat. Hist. xii.

C. v. Bambeke. On the development of *Pelobates fuscus*. (From Mem. R. Acad. Belg.) Ann. Nat. Hist. Ser. 4, iv.

A. Bernhard-Meyer. On the poison-glands of *Callophis intestinalis* and *C. bivirgatus*. (From the Comptes Rendus) Ann. Nat. Hist. Ser. 4, iv.

E. de Betta. The Reptiles and Amphibia of Greece. Proc. R. Venet. Inst. xiv.

A. C. L. Carlleyle. Two new Reptiles from Agra. Journ. Asiat. Soc. Bengal, xxxviii.

E. D. Cope. On the Reptilian orders *Pythonomorpha* and *Streptosauria*. Proc. Bost. Soc. Nat. Hist. xii.

J. E. Gray. On *Hydraspis Gordoni*, a new species from Trinidad, 1 plate. Proc. Zool. Soc. 1868, iii.

A. Günther. First account of tailless Batrachians added to the British Museum, 4 plates. Proc. Zool. Soc. 1868, iii.

M. J. Jullien. On tadpoles reproducing the species (From the Comptes Rendus) Ann. Nat. Hist. Ser. 4, iv.

C. Horne. Snake-poison and reputed antidotes for the same. Zoologist, Ser. 2, iv.

L. Lombardini. On irregular organic forms in Birds and Batrachia, 2 plates. Presented by Mr. Darwin.

O. C. Marsh. On the metamorphosis of *Siredon* and *Amblystoma*. Proc. Bost. Soc. Nat. Hist. xii.

A. B. Meyer. On the venom-apparatus of Serpents, 2 plates. Proc. R. Acad. Sc. Berlin, 1869.

St. G. Mivart. On *Pachybatrachus robustus*, a new genus of anurous Batrachians, woodcut. Proc. Zool. Soc. 1868, iii.

W. C. H. Peters. Note on *Anolis auratus*, Daud. Ann. Nat. Hist. Ser. 4, iv.

W. E. O'Shaughnessy. On *Norops auratus*. Ann. Nat. Hist. Ser. 4, iv.

F. H. Troschel. Report on the contributions to Herpetology in 1866. Wiegm. Arch. xxxiii.

MOLLUSCA :—

G. F. Angas. Twelve new land and marine Shells from Australia and the Solomon Islands, 1 plate. Proc. Zool. Soc. 1869, i.

T. Bland. On certain terrestrial Mollusca, with descriptions of new species. Ann. Lyc. Nat. Hist. N. York, ix.

W. T. Blanford. New species of Cyclophoridæ, of *Ennea* and of *Streptaxis*, 1 plate. Journ. Asiat. Soc. Bengal, xxxviii.

E. Brandt. On the nervous system of *Patella vulgaris*, 1 plate, and of *Chiton fascicularis*, 1 plate. Bull. Acad. Imp. Petersb. xiii.

J. Brazier. On the distribution of *Bulimus miltocheilus* in the Solomon's Archipelago. Proc. Zool. Soc. 1869, i.

C. Claus. On the development of *Cypris*. (From Trans. Nat. Hist. Soc. Marburg) Ann. Nat. Hist. Ser. 4, iv.

J. C. Cox. A new *Haliotis* from N. S. Wales. Proc. Zool. Soc. 1869, i.

H. Eisig. Contributions to the anatomy and history of the development of the sexual organs in *Lymnæus*, 1 plate. Zeitschr. wiss. Zool. xix.

Marq. de Folin. The genus *Meioceras*, 1 plate. (From the Ann. Soc. Linn. Maine-et-Loire.) Presented by the author.

G. W. Hart. On Oysters and Oyster-spat. Journ. Queck. Microsc. Club, i.

J. G. Jeffreys. On some British freshwater Shells. Ann. Nat. Hist. Ser. 4, iv.

W. S. Kent. On *Embletonia Grayii*, a new British Nudibranch, 1 plate. Proc. Zool. Soc. 1869, i.

H. H. Knocker. On pelagic Shells collected during a voyage from Vancouver's Island to this country. Proc. Zool. Soc. 1868, iii.

F. M'Coy. On a new Volute, ½ plate; On the spire of *Voluta Thatcheri*. Ann. Nat. Hist. Ser. 4, iv.

J. D. Macdonald. On the anatomy of *Diplommatina*, 1 plate. Ann. Nat. Hist. Ser. 4, iv.

A. F. Marion. On a new hermaphrodite Nemertean from the Mediterranean. (From the Comptes Rendus) Ann. Nat. Hist. Ser. 4, iv.

A. G. More. On the animal of *Limnæa involuta*, ½ plate. Ann. Nat. Hist. Ser. 4, iv.

G. Neville. Additional notes on the land-shells of the Seychelles Islands. Proc. Zool. Soc. 1869, i.

G. and H. Neville. On new marine Gasteropoda from Ceylon, 2 articles, 2 plates. Journ. Asiat. Soc. Bengal, xxxviii.

H. Pease. Descriptions of the animals of certain species of Auriculidæ. Proc. Zool. Soc. 1869, i.

L. Reeve. Conchologia Iconica, n. 280, 281. Purchased.

M. Sars. Remarks on the distribution of animal life in the depths of the sea. Ann. Nat. Hist. Ser. 4, iii.

F. Stoliczka. The Malacology of Lower Bengal: *Onchidium*, 2 plates. Journ. Asiat. Soc. Bengal, xxxviii.

R. Tate. Terrestrial Mollusca collected in the island of St. Lucia. Ann. Nat. Hist. Ser. 4, iv.

F. H. Troschel. Report on the contributions to the natural history of Mollusca during 1866. Wiegm. Archiv, xxxiii.

— Wedl. On the systems of capillary vessels in the Gasteropods. Ann. Nat. Hist. Ser. 4, iv.

Journal de Conchyliologie, Ser. 3, ix. completed.

Malakozoologishe Blätter to May, 1869.

CRUSTACEA AND ARACHNIDA :—

P. Bonizzi. On the reproduction of *Pholcus phalangioides*. (From the Ann. Soc. Nat. Moden.) Ann. Nat. Hist. Ser. 4, iv.

G. S. Brady. On the Crustacean fauna of the salt marshes of Northumberland and Durham, 2 plates. Nat. Hist. Trans. Northumb. Durh. iii.

R. Buchholz. On the parasitical Crustacea living in Ascidia in the Mediterranean, 7 plates. Zeitschr. wiss. Zool. xix.; abstracted in Ann. Nat. Hist. Ser. 4, iv.

O. P. Cambridge. Catalogue of J. Nietner's collection of Ceylon Araneida, with descriptions of new species. Journ. Linn. Soc. Zool. x.

J. H. Emerton. The habits of Spiders, 1 plate. Amer. Naturalist, ii.

A. Gerstaecker. Report on the scientific contributions to the natural history of Crustacea and Arachnida in 1865–66. Wiegm. Archiv, xxxiii.

C. Heller. On the marine forms of Crustacea which occur in the fresh waters of Southern Europe. Zeitschr. wiss. Zool. xix.; translated in Ann. Nat. Hist. Ser. 4, iv.

E. v. Martens. The South-Brazilian fresh- and brackish-water Crustacea, according to the collections of D. R. Hensel, 2 plates. Wiegm. Archiv, xxxv.

E. D. Nardo. Notes illustrative of 54 species of Crustacea of the Adriatic Sea, 4 plates. Mem. R. Venet. Inst. xiv.

A. M. Norman. Final Report on Shetland Crustacea &c. Rep. Brit. Assoc. Norwich, 1868.

A. Sanders. Notes on Zoosperms of Crustacea, 2 plates. Monthly Microsc. Journ. i.

M. Sars. Remarks on the distribution of animal life in the depths of the sea. Ann. Nat. Hist. Ser. 4, iii.

C. Semper. Remarks on the new genus *Macrobrachium* of Spence Bate. Proc. Zool. Soc. 1868, iii.

S. J. Smith. A new genus and two new species of Scyllaridæ and a new *Æthra* from N. America. (From Sillim. Journ.) Ann. Nat. Hist. Ser. 4, iv.

A. E. Verrill. Descriptions of new American Phyllopod Crustacea. (From Sillim. Journ.) Ann. Nat. Hist. Ser. 4, iv.

H. C. Wood, jun. On the Phalangia and Pedipalpi collected by Prof. Orton in western South America, with descriptions of new African species, 1 plate. Trans. Amer. Philos. Soc. n. ser. xiii.

ENTOMOLOGY :—

Horæ Societatis Entomologicæ Rossicæ, vi. part 2, 2 plates.

Transactions of the American Entomological Society, Washington, ii. parts 1 and 2, 2 plates.

Transactions of the Entomological Society, 1869, parts 2, 3, and 4, and Ser. 3, iii. part 7.

Entomologist and Entomologist's Monthly Magazine, May to October.

J. Bold. On the aculeate Hymenoptera of Northumberland and Durham. Nat. Hist. Trans. Northumb. & Durh. iii.

A. Brandt, jun. Contributions to the history of the development of Libellulidæ and Hemiptera, 3 plates. Mem. Acad. Imp. Sc. Petersb. xiii.

A. G. Butler. Monographic revision of the Lepidoptera hitherto included in the genus *Adelias*, 1 plate. Proc. Zool. Soc. 1868, iii.

——. On *Anemopsyche*, a new genus of Heterocerous Lepidoptera, woodcut. Proc. Zool. Soc. 1869, i.

——. Three new species of *Callidryas*. Ann. Nat. Hist. Ser. 4, iv.

E. P. Cresson. Descriptions of N. American Bees. Proc. Bost. Soc. Nat. Hist. xii.

L. Fasce. The Parasites of Man, 2 plates. Journ. Nat. Sc. Instit. Palermo, iv.

— Foerster. Synopsis of the families and genera of Ichneumons. Trans. Nat.-Hist. Assoc. Rhen. Preuss. xxv.

M. Ganin. Contributions to the anatomy and physiology of the genus *Philopterus*, 1 plate. Zeitschr. wiss. Zool. xix.

A. Gerstaecker. Report on the scientific contributions to Entomology in 1865–66. Wiegm. Archiv, xxxiii.

A. R. Grote. List of the Lepidoptera of N. America, part 1.

T. D. Harris. Entomological Correspondence.—Notes on Larvæ and descriptions of new Insects, edited by S. H. Scudder. Occasional Papers of Bost. Soc. Nat. Hist. i.

T. Kittner. Appendix to the list of Coleoptera found near Boskowitz in Moravia. Trans. Nat.-Hist. Assoc. Brünn, vi.

P. Kramer. Contributions to the anatomy and physiology of the genus *Philopterus*, 1 plate. Zeitschr. wiss. Zool. xix.

L. Landois. Anatomy of *Cimex lectularius*, 2 plates. Zeitschr. wiss. Zool. xix.

S. Lockwood. The goldsmith Beetle and its habits, woodcuts. Amer. Naturalist, ii.

B. T. Lowne. On the rectal papillæ of the Fly, 1 plate. Monthl. Microsc. Journ. ii.

——. Further remarks on the proboscis of the Fly. Journ. Quek. Microsc. Club, i.

R. McLachlan. On the neuropterous genus *Chauliodes* and its allies. Ann. Nat. Hist. Ser. 4, iv.

— Marey. The mechanical reproduction of the flight of Insects. (From the Comptes Rendus) Ann. Nat. Hist. Ser. 4, iv.

V. Motchulsky. Enumeration of new Coleoptera collected during his travels, 1 plate. Bull. Soc. Imp. Nat. Mosc. 1818, ii.

E. Mulsant and — Rey. Natural History of French Coleoptera: tribe Vesiculifera. Ann. Sc. Phys. Nat. Soc. Imp. Agric. Lyons, Ser. 3, xi.

A. Murray. On some points in the history and relations of the Wasp (*Vespa vulgaris*) and *Rhipiphorus paradoxus*. Ann. Nat. Hist. Ser. 4, iv.

E. Norton. Notes on Mexican Ants, 1 plate. Amer. Naturalist, ii.

M. Nowicki. On the caterpillar of the firwood of Copaling and the *Sciara militaris* which proceeds from it, 1 plate.—Descriptions of new Diptera, 1 plate. Trans. Nat. Hist. Assoc. Brünn, vi.

A. S. Packard. Characters of the Lepidopterous family Noctuidæ. Proc. Portl. Soc. Nat. Hist. i.

——. The Parasites of the Honey-bee, 2 plates; A chapter on Flies, 1 plate. Amer. Naturalist, ii.

S. H. Parker. On the respiratory system of Insects. Canad. Naturalist, New Ser. iii.

F. P. Pascoe. Descriptions of new species of Lamiidæ. Ann. Nat. Hist. Ser. 4, iv.

J. C. Puls. Two new Hymenoptera from the Argentine Republic. (From the Trans. Nat. Hist. Soc. Marburg) Ann. Nat. Hist. Ser. 4, iv.

C. Rondani. The larva of *Tischeria complanella* and its parasites. Ann. Nat. Hist. Ser. 4, iv.

O. Salvin. Descriptions of new Butterflies from tropical America. Ann. Nat. Hist. Ser. 4, iv.

F. G. Sanborn. Descriptions of new species of *Erirhinus*;—of the larvæ and pupa-case of *Microdon globosus*, Fabr. Proc. Bost. Soc. Nat. Hist. xii.

G. Sandri. On the ætiology of leprosy, including notes on and

figures of *Acarus elephantinus* and *A. Scabiei.* Proc. R. Venet.

part 1, 1 plate.—Hymenopterological Miscellanies, parts 1 and 2, 1 plate.—New Hymenoptera of the tribe of Scolians, 1 plate (from the Stettin Entom. Zeit.).—Asiatic and African Vespidæ from the Museum of Leyden. All presented by Sir J. Lubbock.

S. H. Scudder. A century of Orthoptera.—Remarks on the arrangement of the families of Orthoptera. Proc. Bost. Soc. Nat. Hist. xii.

——. Revision of the large stylated fossorial Crickets, 1 plate. Mem. Peab. Acad. Sc. Salem, i.

——. The song of the Grasshoppers. Amer. Naturalist, ii.

S. J. Smith. On the Orthoptera of the State of Maine, with descriptions of new species. Proc. Portl. Soc. Nat. Hist. i.

W. P. Suffolk. On the proboscis of the Blow-fly, 3 plates. Monthl. Microsc. Journ. i.

J. Watson. On the plumules or battledore-scales of Lepidoptera, 2 papers. Mem. Lit. Phil. Soc. Manchester, Ser. 3, iii.; and Monthl. Microsc. Journ. ii., with 3 plates.

F. H. Wenham. Remarks on *Podura*. Monthl. Microsc. Journ. ii.

C. P. Whitney. A new species of *Thecla*. Proc. Portl. Soc. Nat. Hist. xii.

T. V. Wollaston. Coleoptera Atlantidum, 1 vol. 8vo, 1865.—Coleoptera Hesperidum, 1 vol. 8vo, 1867. Purchased.

——. On the Coleoptera of St. Helena. Ann. Nat. Hist. Ser. 4, iv.

A. Yersin. Note on *Pachytilus migratorius* (from the Archiv. Scien. Bibl. Genev.). Presented by Sir J. Lubbock.

LOWER ANIMALS :—

T. Alcock. Questions regarding the life-history of Foraminifera. —On *Polymorphina tubulosa*. Mem. Lit. Phil. Soc. Manchester, Ser. 3, iii.

J. Allman. On the structure of *Coppinia arcta*. Rep. Brit. Assoc. Norwich, 1868.

W. Baird. A new species of Earth-worm from North Wales. Proc. Zool. Soc. 1869, i.

——. Remarks on the genera of Annelids of the group *Eunicea*, with descriptions of species. Journ. Linn. Soc. Zool. x.

L. S. Beale. Protoplasm and living matter. Monthl. Micr. Journ. i.

J. S. Bowerbank. A monograph of the silicео-fibrous Sponges, 4 plates. Proc. Zool. Soc. 1869, i.

R. Buchholz. History of the development of *Alciope*. Zeitschr. wiss. Zool. xix.

W. B. Carpenter. On the Rhizopodal fauna of the deep sea. Monthl. Microsc. Journ. ii.

H. J. Carter. Four subspherous Sponges, Arabian and British, 2 plates.—On *Grayella cyathophora*, a new genus of Sponges, 1 plate. Ann. Nat. Hist. Ser. 4, iv.

E. Claparède. The chætopodous Annelids of the Gulf of Naples, part 2, 15 plates. Mem. Soc. Phys. Hist. Nat. Geneva, xx.

——. On an Alciopid parasite of *Cydippe densa*, Forsk., 1 plate. (From Mem. Soc. Ital. Sc. Nat.) Ann. Nat. Hist. Ser. 4, iv.

E. Claparède and E. Mesnikow. Contributions to the history of the development of Chætopoda, 6 plates. Zeitschr. wiss. Zool. xix.

C. Cubitt. *Floscularia coronella*, a new species of Rotifera, 2 plates. Monthl. Microsc. Journ. ii.

L. Fasce. Parasites of Man, 2 plates. Journ. Sc. Nat. Techn. Inst. Palermo, iv.

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J. C. Galton. The structure and affinities of Sea-squirts (Tunicata), 1 plate. Pop. Sc. Rev. viii.

J. E. Gray. On *Oculinaria*, a new genus of social Ascidia, woodcut.—On *Theonella*, a new genus of coralloid Sponges from Formosa, woodcut.—On the Ceratelladæ, a family of Keratose Sponges, woodcuts.—On *Xylospongia Cookii*, a new genus of palmated Sponges. Proc. Zool. Soc. 1868, iii.

——. On *Ianthella*, a new genus of Keratose Sponges. Proc. Zool. Soc. 1869, i.

——. On *Spoggodes conglomeratus* and a new genus of fleshy Alcyonoids. Ann. Nat. Hist. Ser. 4, iv.

R. Greeff. Researches on some remarkable forms of the type of Arthropoda and Worms, 4 plates. Wiegm. Archiv, xxxv.

E. Grube. New or little-known Annelids from the Red Sea. Proc. R. Acad. Sc. Berlin, 1869.

T. Hincks. The sertularian Zoophytes of the British shores, 2 plates. Pop. Sc. Rev. viii.

C. T. Hudson. Notes on *Hydatida senta*, 1 plate. Monthl. Microsc. Journ. ii.

A. Hyatt. Freshwater Polyzoa occurring in Maine. Proc. Portl. Soc. Nat. Hist. i.

J. M. Jones. On the Coralliaria of the Bermudas. Trans. Nov., Scot. Inst. Nat. Sc. ii.

W. S. Kent. On some new Infusoria from the Victoria Docks. Monthl. Microsc. Journ. i.

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R. Leuckart. Report on the scientific contributions to the natural history of Lower Animals during the years 1866 and 1867. Wiegm. Archiv, xxxiii., xxxiv.

S. Lovén. On *Leskia mirabilis*, Gray (from the Swedish). Canad. Naturalist, iii.

——. On *Hyponome Sarsi*, a recent Cystidean (from Trans. Scand. Nat. Christiania, 1868).—On *Spatangus Raschi*. Ann. Nat. Hist. Ser. 4, iv.

F. Lütken. Additions to the history of Ophiuridæ, part 3, Radiolariæ. Trans. R. Dan. Soc. Sc. Copenhagen, Ser. 5, viii.

W. C. M'Intosh. On the early stages of the development of *Phyllodoce maculata*, 1 plate. Ann. Nat. Hist. Ser. 4, iv.

A. J. Malmgren. On the genus *Heteronereis*, Œrst., 2 articles. Wiegm. Archiv, xxxv.

N. Melnikow. On the young state of *Tænia cucumerina*, 1 plate. Wiegm. Archiv, xxxv.

G. Moquin-Tandon. On a new hermaphrodite Chætopod Annelid. (From the Comptes Rendus) Ann. Nat. Hist. Ser. 4, iv.

A. M. Norman. Final report on Shetland Tunicata, Polyzoa, Echinodermata, Actinozoa, Polyzoa, and Porifera. Rep. Brit. Assoc. Norwich, 1868.

A. S. Packard, jun. A few Sea-worms. Amer. Naturalist, ii.

A. Pagenstecher. A new mode of development in *Siphonophoræ*, 1 plate. Zeitschr. wiss. Zool. xix.

L. F. de Pourtalès. Contributions to the Fauna of the Gulf-stream at great depths, 2nd series. Bull. Mus. Comp. Zool. Cambr. U.S.

F. Ratzel. Histological researches on Lower Animals, 2 plates. Zeitschr. wiss. Zool. xix.

M. Sars. Remarks on the distribution of animal life in the depths of the sea. Ann. Nat. Hist. Ser. 4, iii.

G. Schach. On some freshwater *Radiolariæ*, and the place of Radiolariceæ in the class of Rhizopods. Journ. Nat. Hist. Soc. Zurich, xiii.

J. G. Tatem. On free-swimming *Amœbæ*. Monthl. Microsc. Journ. i.

W. Thomson. On *Hottenia*, a new genus of vitreous sponges, woodcut. Proc. R. Soc. xvii., and Monthl. Microsc. Journ. ii.

——. On the depths of the sea. Ann. Nat. Hist. Ser. 4, iv.

F. H. Troschel. Additional remarks on the genus *Crustulum*. Wiegm. Archiv, xxxv.

A. E. Verrill. Synopsis of Polyps and Corals of the North-Pacific Exploring Expedition, Part 4, Actinaria, 1 plate. Proc. Essex Inst. Salem, v.

——. North-American Sea-anemones, 1 plate. Amer. Naturalist, ii.

——. A new Jelly-fish and two Actinians from the coast of Maine. (From Sillim. Journ.) Ann. Nat. Hist. Ser. 4, iv.

R. v. Willemoes-Suhm. Helminthological notes, 1 plate. Zeitschr. wiss. Zool. xix.

W. Wood. *Clio borealis* on the coast of Maine, woodcut. Proc. Portl. Soc. Nat. Hist. i.

J. Wyman. On *Filaria anhingæ*, a Threadworm infesting the brain of the Snake-bird. Proc. Bost. Soc. Nat. Hist. xii.

PHÆNOGAMIC BOTANY:—

C. C. Babington. The British *Rubi*, 1 vol. 12mo. Presented by the Author.

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——. Notes on tropical fruits. Amer. Naturalist, ii.

F. Buchenau. On the direction of the ovulum in Alismaceæ, 1 plate. Pringsh. Jahrb. vii.

——. Critical index of Butomaceæ, Alismaceæ, and Juncagineæ. Seem. Journ. Bot. vii.

D. Clos. On the floral characters of *Koelreuteria*. Bull. Soc. Bot. Fr. xvi.

F. Delpino. Sketch of the biological and genealogical relations of Marantaceæ. Presented by the Author.

A. Drummond. On the Flora of Ontario and Quebec compared with that of the United States. Canad. Naturalist, New Ser. iii.

— Duval-Jouve. On the *Salicornia* of the Hérault. Bull. Soc. Bot. Fr. xv.

A. G. Eichler. Balanophoreæ, 16 plates. Mart. Fl. Bras. Purchased.

Père Eugène. A new French *Crocus*. Bull. Soc. Bot. Fr. xv.

T. B. Flower. Flora of Wiltshire, n. 12. Presented by the Author.

E. Fournier. On Lennoaceæ. Bull. Soc. Bot. Fr. xv., xvi.

A. Franchet. On parallel variations of *Verbascum* in France and Central Europe. Bull. Soc. Bot. Fr. xvi.

L. Goodale. Catalogue of the flowering Plants of Maine. Proc. Portl. Soc. Nat. Hist. i.

L. Grüner. Enumeration of Plants from the Dnieper and lower Konka rivers in S. Russia, 1 plate. Bull. Soc. Imp. Nat. Mosc. 1868, ii.

H. T. Hance. Various notes and descriptions of Chinese plants. Seem. Journ. Bot. vii.

C. Hasskarl. On *Castoreum*, Br. Flora, 1869.

F. v. Herder. Plantæ Raddianæ monopetalæ (continued). Bull. Soc. Imp. Nat. Mosc. 1868, ii.; also separate copies of this and previous parts, presented by Dr. Regel.

S. Kurz. On *Pandanophyllum* and allied genera.—On the species of *Pandanus*. Journ. Asiat. Soc. Bengal, xxxviii.; and separate copies presented by the Author.

J. Lange. Plants rare or new to the Danish Flora. Journ. Bot. Soc. Copenh. ii.

H. Lecoq and M. Lamotte. Catalogue raisonné des Plantes vasculaires du plateau central de la France, 8vo, 1848. Presented by Mr. Hanbury.

W. L. Lindsay. Notes on some Compositæ of Otago, New Zealand. Seem. Journ. Bot. vii.

J. Lloyd. On *Ilysanthes gratioloides* in Western France. Bull. Soc. Bot. Fr. xv.

H. Mann. On *Alsinidendron*, *Platydesmia*, and *Brighamia*, new genera of Hawaian plates, with an analysis of the Hawaian flora, 3 plates. Mem. Bost. Soc. Nat. Hist. i.

——. Statistics and geographical range of Hawaian Plants. Seem. Journ. Bot. vii.

G. F. Matthew. On the occurrence of Arctic and Western plants in Continental Acadia. Canad. Naturalist, New Ser. iv.

T. Meehan. On the leaves of Coniferæ. (From Proc. Amer. Assoc. Adv. Sci.) Ann. Nat. Hist. Ser. 4, iv.

C. F. Meissner. Convolvulaceæ, 52 plates. Mart. Fl. Bras.

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H. Mortensen. Various papers on the vegetation of Jutland and Zealand. Journ. Bot. Soc. Copenhagen, iv.

Ferd. Mueller. Fragmenta Phytographiæ Australiæ, n. 50. Presented by the Author.

Fritz. Mueller. On a dimorphous *Faramea*. Bot. Zeit. 1869.

H. Mueller. On Westphalian Orchideæ, 2 plates. Trans. Nat. Hist. Assoc. Rhen. Prussia, xxv.

A. Œrsted. On the flowers of *Neea theifera* and *Halesia tetraptera*, woodcuts. Bot. Zeit. 1869.

——. On the plant known to the ancients under the name of *Silphium*. Proc. R. Dan. Soc. Sc. 1869.

F. Parlatore. Flora Italiana, ii. (conclusion), iii., iv. part 1. Purchased.

A. Pérard. On the section *Chronosemium* of *Trifolium*. Bull. Soc. Bot. Fr. xv.

E. Regel. Index Seminum Horti Petropolitani, 1868, with descriptions of new Plants. Presented by the Author.

—— and F. v. Herder. Enumeration of Semenov's Transilian Plants. (From the Bull. Soc. Imp. Nat. Mosc.) separate copy, presented by Dr. Regel.

H. G. Reichenbach, f. *Dendrobium crassinode*; *Cypripedium Parishii*. Flora, 1869.

J. T. Rothrock. Sketch of the flora of Alaska. Rep. Smiths. Inst. 1867.

W. W. Saunders. Refugium Botanicum, part 3. Presented by the Author.

H. C. C. Scheffer. Phytographical observations (chiefly relating to Javan plants). Flora, 1869.

M. Seubert. Flora Azorica, 4to, 15 plates. Purchased.

S. Sirodot. On *Coleanthus subtilis* lately added to the French flora. Ann. Sc. Nat. Ser. 5, Bot. x.

D. Sloboda. Enumeration of the plants of the neighbourhood of Rottalowitz in Moravia. Trans. Nat. Hist. Assoc. Brünn, vi.

R. Spruce. *Palmæ Amazonicæ*, enumeration of the Palms collected by the Author in his travels in Equatorial America. Journ. Linn. Soc. Bot. xi.

J. B. Syme. Report of the London Botanical Exchange Club, 1869. Seem. Journ. Bot. vii.

T. Teplouchoff. On *Picea obovata*, Ledeb., woodcuts. Bull. Soc. Imp. Nat. Mosc. 1869, ii.

E. Timbal-Lagrave and others. Notes on Pyrenean plants, with a plate of a supposed new *Campanula*. Bull. Soc. Bot. Fr. xv.

L. R. Tulasne. Floræ Madagascariensis fragmenta (various parietal Polypetalæ). Ann. Sc. Nat. Ser. 5, Bot. ix.

R. Visiani and P. Saccardo. Catalogue of the vascular Plants of Venetia. Proc. R. Venet. Inst. xiv.

Walpers. Annales Botanices Sytematicæ, vii. n. 3. Purchased.

E. Warming. Remarks on *Scopolia atropoides* and other Solaneæ. Journ. Bot. Soc. Copenh. iii.

F. Wilms. *Gymnadenia Anacamptis*, a new hybrid Orchid. Proc. Nat. Hist. Assoc. Rhen. Pruss. xxv.

English Botany, new edition, x. parts 71 to 73. Presented by the Publisher, Mr. Hardwicke.

Botanical Magazine, 3rd Ser. nos. 295–299, 8vo, London, 1869. Purchased.

PHYSIOLOGICAL AND MISCELLANEOUS BOTANY :—

H. A. Aé. On the physiological importance of acetate of lime in plants. Flora, 1869.

T. Anderson. Report on the cultivation of Cinchona in Bengal for 1867–68. Seem. Journ. Bot. vii.

D. Barnsby. On an anomaly in *Raphanus caudatus*. Bull. Soc. Bot. Fr. xv.

A. Barthélemy. On the part taken by the cuticle in the respiration of plants. Ann. Sc. Nat. Ser. 5, Bot. ix.

Alph. de Candolle. Answers to questions and criticisms on the laws of botanical nomenclature. Bull. Soc. Bot. Fr. xvi.

R. Caspary. On the injuries to horsechestnut-leaves through friction from wind. Bot. Zeit. 1869.

M. Cornu. On *Melandrium dioicum* becoming monœcious when attacked by an *Ustilago*. Bull. Soc. Bot. Fr. xvi.

C. Darwin. Notes on the fertilization of Orchids. Ann. Nat. Hist. Ser. 4, iv.

P. P. Dehérain. On the respiration of aquatic plants in darkness. Ann. Sc. Nat. Ser. 5, Bot. ix.

E. Delarue. On the crystal-glands in some plants. Bot. Zeit. 1869.

F. Delpino. Critical notice of Hildebrand's work on the laws of distribution of the sexes in plants.—Ulterior observations on Dichogamy in the vegetable kingdom.—Thoughts on vegetable biology.—On the Darwinian theory of Pangenesis.—Notes on botanical geography *à propos* of Prof. Hoffman's Phytogeographical Tables.—Summary of observations made on the fecundating apparatus of phænogamous plants. All pamphlets presented by the Author.

J. Duval-Jouve. On the leaf-sheaths and nodes of some Gramineæ.—On the walls of the cells in *Panicum vaginatun*. Bull. Soc. Bot. Fr. xvi.

A. W. Eichler. Remarks on the structure of the flower in Cruciferæ and on dédoublement, 1 plate. Flora, 1869.

E. Faivre. On the morphological nature of the ovule in *Primula sinensis*. Bull. Soc. Bot. Fr. xvi.

——. On the latex in the White Mulberry. Ann. Sc. Nat. Ser. 5, Bot. x.

K. W. v. Gorkom. Report on the Cinchona-culture in Java in 1867: Journ. Nat. Sc. Neth. Ind. xxx.—The same for 1869 : Flora, 1869.

J. Hanstein. On the boring into the ground of the fruits of Geraniaceæ. Bot. Zeit. 1869.

P. Heiberg. Critical observations on Professor Œrsted's explanation of the flowers of Gymnosperms, woodcuts.—Morphological anatomy of *Heleocharis palustris*, 3 plates. Journ. Bot. Soc. Copenhagen, ii.

—Hennessy. On the possible introduction of South-European plants in the West and South of Ireland. Rep. Brit. Assoc. Norwich, 1869.

F. Hildebrand. Further observations on the fertilization of flowers, 1 plate. Bot. Zeit. 1869.

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G. Kraus. On the tension of vegetable tissue and its consequences. Ann. Sc. Nat. Ser. 5, Bot. x.

——. On the causes of the alteration of form in etiolated plants. Pringsh. Jahrb. vii.

J. de Lahange. On some monstrous wild Cherries. Bull. Soc. Vaud. Hist. Nat. x.

J. Lange. Remarks on the dimorphous seeds of *Atriplex hortensis*. Journ. Bot. Soc. Copenh. ii.

C. Lavranov. Elements of Botany, Organography, Physiology, and Taxonomy, 8vo, plates, 1853 (in modern Greek). Presented by Mr. Hanbury.

C. Luerssen. On the controversy on the unicellular or pluricellular structure of the pollen in Onagrarieæ, Cucurbitaceæ, and Corylaceæ, 3 plates. Pringsh. Jahrb. vii.

C. v. Martius. On the preparation of a savoury, wholesome, and nutritious bread from Mandiocca flour, with observations by M. A. de Macedo. Flora, 1869.

M. T. Masters. Vegetable Teratology, 1 vol. 8vo, numerous woodcuts. From the Ray Society.

Fritz Mueller. On some phenomena of fertilization. Bot. Zeit. 1869.

N. J. C. Mueller. Researches on the diffusion of atmospheric gases in plants, 1 plate.—On the passage of steam through closed epidermal cells.—On the colouring-matter in chlorophyll. Pringsh. Jahrb. vii.

A. Krempelhuber. On *Parmelia perforata*. Flora, 1869.

M. Kuhn. Reliquiæ Mettenianæ (Filices), continued. Linnæa, xxxvi.

——. On the rust of Beet-leaves, *Uromyces Betæ*. Bot. Zeit. 1869.

M. T. Lange. On the Mosses of Tuscany. Journ. Bot. Soc. Copenh. ii.

——. Contributions to Danish Bryology. Journ. Bot. Soc Copenh. iii.

W. A. Leighton. Notulæ Lichenologicæ (continued). Ann. Nat. Hist. Ser. 4, iv.

P. J. Lorentz. On the anatomy of the transverse section of Mosses, 6 plates. Flora, 1869.

——. Note on the indigenous species of *Cinclidotus*. Bot. Zeit. 1869.

R. L. Maddox. On *Mucor Mucedo*, 1 plate. Monthl. Microsc. Journ. ii.

E. v. Martens. Contributions to the Algæ-flora of East India. Flora, 1869.

A. Millardet. On the nature of the pigment in Fucoideæ. Ann. Sc. Nat. Ser. 5, Bot. x.

W. Mitten. Musci Austro-Americani (Enumeration of all South-American Mosses hitherto known to him). Journ. Linn. Soc. xii.

C. Mueller. On a collection of Ceylon Mosses. Linnæa, xxxvi.

G. Niessl. On *Asplenium adulterinum* and its occurrence in Moravia. Trans. Nat.-Hist. Un. Brünn, vi.

W. Nylander. Kurz's Bengal Lichens;—a New-Zealand Cephalodium-bearing *Sphærophora*;—on the chemical reactions of *Parmelia*, of *Ricasolia*, of *Physcia*, of *Umbilicaria*; and other Lichenological papers. Flora, 1869.

C. Prentice. A new *Hypoderris* from Central America. Seem. Journ. Bot. vii.

J. B. Reade. On the Diatom-prism and the true form of Diatom-markings (2 articles). Monthl. Microsc. Journ. ii.

E. Roze. New researches on the antherozoids of Mosses. Bull. Soc. Bot. Fr. xv.

E. Roze and M. Cornu. On two new genera of Saprolegnieæ and Peronosporeæ. Bull. Soc. Bot. Fr. xvi.; Ann. Nat. Hist. Ser. 4, iv.

J. de Seynes. On *Mycoderma vini*, 2 papers. Bull. Soc. Bot. Fr. xv.; Ann. Sc. Nat. Ser. 5, Bot. x.; Bot. Zeit. 1869.

J. de Seynes. On *Mycenastrum*, 2 papers. Bull. Soc. Bot. Fr. xvi.

W. G. Smith. New and rare British hymenomycetous Fungi. Seem. Journ. Bot. vii.

A. Trécul. On Beer-yeast and on *Mycoderma cerevisiæ*. Ann. Sc. Nat. Ser. 5, Bot. x.

V. Trevisan. On the Ferns called *Struthiopteris* and their nearest allies. Proc. R. Venet. Inst. xiv.

H. A. Weddell. The Lichens of the public promenades of Poitiers. Bull. Soc. Bot. Fr. xvi.

F. H. Wenham. Remarks on the structure of Diatoms and Podura. Monthl. Microsc. Journ. ii.

G. Zanardini. Selection of new or rare Fucoideæ of the Mediterranean and Adriatic seas, 8 plates. Mem. R. Venet. Inst. xiv.

——. Iconographia phycologica Mediterraneo-Adriatica, ii. part 4, 8 plates. Purchased.

Palæontology :—

I. P. Barkas. On a supposed Mammalian tooth from the coal measures, woodcuts. Monthl. Microsc. Journ. i.

E. Billings. New Fossils from the Silurian and Devonian rocks of Maine. Proc. Portl. Soc. Nat. Hist. i.

——. Note on the structure of Blastoidea. (From Sillim. Journ.) Ann. Nat. Hist. Ser. 4, iv.

W. B. Carpenter and H. B. Brady. On *Parkeria* and *Loftusia*, two gigantic types of arenaceous Foraminifera. Proc. R. Soc. xvii.

W. Carruthers. The cryptogamic forests of the coal-period. Proc. R. Instit. v.

——. On the structure of the stems of the arborescent Lycopodiaceæ of the coal measures, 1 plate. Monthl. Microsc. Journ. ii.

J. W. Dawson. On some remarkable genera of plants of the coal formation. Canad. Naturalist, New Ser. iii.

——. On Calamites. Ann. Nat. Hist. Ser. 4, iv.

A. Dohrn. On *Julus Brassii*, a new Myriapod from the coal, 1 plate. Trans. Nat. Hist. Assoc. Rhen. Pruss. xxv.

P. M. Duncan. First report on British fossil corals. Rep. Brit. Assoc. Norwich, 1869.

P. M. Duncan and H. M. Jenkins. On *Palæocoryne*, a genus of tubularine Hydrozoa. Proc. R. Soc. xvii.

C. G. Ehrenberg. On the extensive strata of microscopical Bacillariæ under and near the city of Mexico. Proc. R. Acad. Berlin, 1869

C. v. Ettingshausen. The fossil flora of the older coal formation of Wetterau, 5 plates. Proc. Imp. Acad. Sc. Vienna, Nat. Hist. lvii.

G. G. Gemmellaro. On the fauna of the *Terebratula-janitor* limestone of Sicily, 4 plates. Journ. Nat. Sc. Techn. Instit. Palermo, v.

— Grand'Eury. On Calamites and Asterophyllites. (From the Comptes Rendus) Ann. Nat. Hist. Ser. 4, iv.

C. W. Gümbel. Contributions to the Foraminiferous fauna of the Northern Alpine Eocene formation, 4 plates. Trans. R. Acad. Munich, x.

A. Hancock and T. Atthey. Notes on various species of *Ctenodus* obtained from the shales of the Northumberland coal field, 3 plates. —Remains of some Reptiles and Fishes from the same. Nat. Hist. Trans. Northumb. and Durh. iii.

—— ——. On a new Labyrinthodont Amphibian from the Northumberland coal field, 2 papers.—On some curious fossil fungi from the black shale of the Northumberland coal field, 2 plates.—On the generic identity of *Climaxodus* and *Janassa*, two fossil fishes related to the Rays, 1 plate. Ann. Nat. Hist. Ser. 4, iv.

L. Lesquereux. On fucoids in the coal formation, 1 plate.—On species of forest plants from the tertiary in the State of Mississippi, 10 plates. Trans. Amer. Phil. Soc. New Ser. xiii.

S. S. Lyon. Remarks on thirteen new species of Crinoidea from the palæozoic rocks of Indiana, Kentucky, and Ohio, and on peculiarities in the structure of *Dolatocrinus*, 2 plates. Trans. Amer. Phil. Soc. New Ser. xiii.

C. Mayer. Catalogue of the tertiary Mollusca of the Federal Museum at Zurich. Journ. Nat. Hist. Soc. Zurich, xii., xiii.

P. Merian. Fossils of the tertiary of Therwyler, near Basle.—Fossils of St. Verena near Soleure. Trans. Nat. Soc. Basle, v.

Alph. Milne-Edwards. On the ancient fauna of the Mascarene islands. (From the Comptes Rendus) Ann. Nat. Hist. Ser. 4, iv.

J. S. Newbury. Notes on the later extinct floras of N. America, with descriptions of new species. Ann. Lyc. Nat. Hist. N. York, ix.

H. A. Nicholson. Some new species of Graptolites, 1 plate. Ann. Nat. Hist. Ser. 4, iv.

R. Owen. On *Dinornis*, parts 11 and 12, 3 plates. Trans. Zool. Soc. vi.

——. On the remains of a large extinct Lama (*Palauchenia magna*), from quaternary deposits in Mexico. Proc. R. Soc. xvii.

G. de Saporta. On the flora of the Pliocene tufas of Meximieux. Bull. Soc. Bot. Fr. xvi.

A. Schenk. On some remains of plants in the Braunkohl of Saxony. Bot. Zeit. 1869.

H. C. Wood, jun. Contribution to the knowledge of the flora of the coal period in the United States, 2 plates. Trans. Amer. Phil. Soc. New Ser. xiii.

H. Woodward. Fourth report on the structure and classification of fossil Crustacea, 1 plate. Rep. Brit. Assoc. Norwich, 1868.

A. de Zigno. Descriptions of fossil Cycadeeae from the Oolites of the Venetian Alps. Proc. R. Venet. Inst. xiii.

Miscellaneous.

G. Bidie. Report on the ravages of the Borer in coffee estates, and on coffee culture in southern East India, with a map. Presented by the Author.

Miss Brightwell. Memorials of the life of Mr. Brightwell of Norwich. Presented by the Author.

H. Christy and E. Lartet. Reliquiæ Aquitanicæ, part 9. Presented by the Executors of the late H. Christy.

Forest Administration of India. Reports: Bombay, 1860–61 to 1867–68; Mysore, 1867–68; Sind, 1860–61 to 1866–67, 1867–68, 1868–69; Oudh, 1867–68. Presented by the Indian Department.

T. H. Huxley. Anniversary Address to the Geological Society, 1869. Presented by the Author.

International Horticultural Exhibition of St. Petersburg. Catalogue. Presented by Dr. Regel.

E. Lankester. Sixth Annual Report of the Coroner for the Central District of Middlesex. Presented by the Author.

Washington Department of Agriculture. Report of the Commissioners for 1867. Presented by the Department.

Mr. W. G. Smith, F.L.S., exhibited a specimen of a new British Fungus (*Cantharellus carbonarius*, Alb. and Schw.), discovered by him on burnt earth and charcoal heaps in Epping Forest.

An extract of a letter was read from the Marquis de Folin, re-

questing the cooperation of the Fellows in a work upon which he is engaged, entitled " Les Fonds de la Mer."

The President read the resolutions adopted at a Meeting held on the 21st of June last, with reference to a proposed Memorial to the late Professor Faraday; and stated that he had received a letter from Dr. Bence Jones, the Secretary, intimating that the Subscription List will shortly be closed, and requesting early payment of any subscriptions intended to be contributed by the Fellows of the Linnean Society.

The following papers were read:—

1. " Notes on some Brazilian plants from the neighbourhood of Campinas," by Joaquim Correa de Mello: in a letter to the President. (Translated from the Portuguese.)

2. " Note on two plants (*Althæa Ludwigii* and *Cystanche tubulosa*) new to the Peninsula of India," by N. A. Dalzell, Esq.

3. " On the occurrence of *Astraptor illuminator*, Murr., or a closely allied insect, near Buenos Ayres," by Roland Trimen, M.Ent.Soc. Communicated by Henry Trimen, M.B., F.L.S.

November 18th, 1869.

George Bentham, Esq., President, in the Chair.

The following papers were read:—

1. " Review of the genus *Hydrolea*, with descriptions of three new species," by Alfred William Bennett, Esq., M.A., B.Sc., F.L.S.

2. " On the classification and nomenclature of the species and varieties of *Hedera*," by Shirley Hibbard, Esq. Communicated by William Robinson, Esq., F.L.S.

December 2nd, 1869.

George Bentham, Esq., President, in the Chair.

William R. Guilfoyle, Esq., was elected a Fellow.

Mr. T. B. Flower, F.L.S., exhibited specimens of *Draba aizoides* from Pennard Castle, near Swansea, the station where it was originally found by Dr. Turton in 1803; and from St. Vincent's Rocks, specimens of the depauperated state of *Allium sphærocephalum*, described by Boreau as *A. Deseglisii.*

The following papers were read:—

1. "Flora of Newfoundland," by Henry Reeks, Esq., F.L.S.

2. "Note on *Capparis divaricata*, Lam., and *C. Heyneana*, Wall.," by Hugh F. C. Cleghorn, M.D., F.L.S.

December 16th, 1869.

George Bentham, Esq., President, in the Chair.

The following papers were read:—

1. "On a species of *Ipomæa* affording Tampico Jalap," by Daniel Hanbury, Esq., F.R. & L.S.

2. "On the necessity of a reform in the Generic Nomenclature of Diurnal *Lepidoptera*, illustrated by a review of the Genera proposed from the time of Linnæus to the year 1816," by W. F. Kirby, Esq., M.E.S., &c. Communicated by H. T. Stainton, Esq., Sec. L.S.

3. "A Catalogue of the Aculeate *Hymenoptera* and *Ichneumonidæ* of India and the Eastern Archipelago," by Frederick Smith, Esq., with introductory remarks by A. R. Wallace, Esq. Communicated by W. Wilson Saunders, Esq., V.P.L.S.

January 20th, 1870.

George Bentham, Esq., President, in the Chair.

Nathaniel Lawrence Austen, Esq., Colonel R. Benson, Frederick

Pryor Balkwill, Esq., John Goucher, Esq., George Harrison, Esq., Charles Augustus Robinson, Esq., Edward Taylor, Esq., and Alfred Woodward, Esq., were elected Fellows.

The following papers were read:—

1. "A revision of the Flora of Iceland," by Charles Cardale Babington, M.A., F.R. & L.S., Professor of Botany in the University of Cambridge.

2. "Contributions to British Muscology," by S. O. Lindberg, M.D., Professor of Botany at the University of Helsingfors, Finland. Communicated by J. D. Hooker, M.D., V.P.L.S.

3. "On new British Spiders," by the Rev. O. P. Cambridge. Communicated by James Salter, Esq., F.R. & L.S.

February 3rd, 1870.

George Bentham, Esq., President, in the Chair.

Robert O. Cunningham, M.D., was elected a Fellow.

The following papers were read:—

1. "On *Myrocarpus frondosus*, Allem.," by J. Correa de Mello, of Campinas, in South Brazil; translated from the Portuguese, with a note, by the President.

2. "Revision of the genera and Species of Herbaceous Capsular Gamophyllous *Liliaceæ*," by J. H. Baker, Esq., F.L.S.

3. "On a new form of Cephalopodous Ova," by Cuthbert Collingwood, M.A., F.L.S., &c.

February 17th, 1870.

George Bentham, Esq., President, in the Chair.

Richard B. Sharpe, Esq., was elected a Fellow.

The following papers were read:—

1. "Notes on the Tree-Ferns of British Sikkim: with descrip-

tions of three new species, and a few supplementary remarks on their relation to Palms and Cycads," by John Scott, Curator of the Royal Botanic Gardens, Calcutta. Communicated by Thomas Anderson, M.D., F.L.S.

2. "On the *Commelynaceæ* of Bengal," by C. B. Clarke, Esq., Officiating Superintendent of the Royal Botanic Gardens, Calcutta. Also communicated by Dr. Anderson.

3. Extract of a letter from Dr. H. F. Hance to Dr. Hooker, V.P.L.S., dated Whampoa, 4th October, 1869, on the Botany of the White Cloud (Pakwan) Hills, near Canton. Communicated by Dr. Hooker.

March 3rd, 1870.

J. D. Hooker, Esq., M.D., V.P., in the Chair.

Aaron George Medwin, M.D., and John Beswick Perrin, Esq., were elected Fellows.

The following papers were read:—

1. "Note on Hybridism among *Cinchonæ*," by J. Broughton, B.Sc.; with Introductory Remarks by J. E. Howard, Esq., F.L.S.

2. Letter from Sir Henry Barkly, K.C.B., to Dr. Hooker, on the Natural History of Round Island, one of the dependencies of Mauritius.

March 17th, 1870.

George Bentham, Esq., President, in the Chair.

Mr. Carruthers, F.L.S., exhibited a specimen of a fossil *Osmunda* from the Lower Tertiaries, which was remarkable for the perfect preservation, not only of the tissue, but also of the starch-contents of its cells, and of the mycelium of a parasitic Fungus.

The following papers were read:—

1. "Notes on the Flora and Fauna of Round Island," by Sir Henry Barkly, K.C.B., and Colonel Nicholas Pike. Communicated by Dr. Hooker, V.P.L.S.

2. Extract from a letter of Colonel Lloyd, Surveyor-General of

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the Mauritius, on the Natural History of Round Island and Serpent Island. Also communicated by Dr. Hooker.

April 7th, 1870.

George Bentham, Esq., President, in the Chair.

Charles Packe, Esq., was elected a Fellow.

The following papers were read:—

1. "Notes on some *Algæ* found in the North-Atlantic Ocean," by George Dickie, M.D., F.L.S.

2. "On the occurrence of Pleiotaxy of the Perianth in *Philesia*," by R. O. Cunningham, M.D., F.L.S.

3. "Descriptions of some new species of *Annelida* and *Gephyrea* in the Collection of the British Museum," by Wm. Baird, M.D., F.R. & L.S.

April 21st, 1870.

George Bentham, Esq., President, in the Chair.

James Britten, Esq., was elected a Fellow.

The following paper was read:—

"On the Vertebrate Skeleton," by St. George J. Mivart, Esq., F.L.S., &c.

May 5th, 1870.

George Bentham, Esq., President, in the Chair.

Professor Spencer F. Baird, Ritter Georg von Frauenfeld, Dr. William Lilljeborg, M. Charles Naudin, and Dr. Roberto de Visiani were severally elected Foreign Members.

The following papers were read:—

1. "*Libanothamnus*, novum Compositarum genus e Venezuela," proponit Adolphus Ernst, Soc. Caracasanæ Scient. Phys. et Nat. Præses, &c. Communicated by Dr. J. D. Hooker, V.P.L.S.

2. Letter from Dr. Kirk, F.L.S., to Dr. Hooker, containing further observations on the Copal of Zanzibar.

3. Letter from Colonel Grant to Dr. Hooker on the same subject. Both communicated by Dr. Hooker.

The following Report on the Accessions to the Library was laid before the Meeting:—

The Publications of Scientific Bodies received since the date of the last Report (Nov. 4th, 1869) have been the following:—

DENMARK:—

Royal Danish Society of Sciences. *Proceedings 1869, part 2.
Botanical Society of Copenhagen, Journal (Tidskrift), iii. part 2.

SWEDEN:—

Royal Academy of Sciences, Stockholm. Transactions (Handlingar), New Series, v. part 2, vi. vii. part 1.—Proceedings (Œfversigt af Förhandlingar), xxii. (1865) to xxv. (1868).—Obituary Notices of the Members of the Academy deceased since 1854, i. part 1.—Three separate biological papers, and the conclusion of E. Fries's Edible Fungi.

University of Lund, Transactions (Acta or Års-skrift) for 1868.

RUSSIA:—

Imperial Academy of Sciences, St. Petersburg. Memoirs, 7th series, xiii. part 8, and xiv. parts 1 to 7.—Bulletin, xiv. parts 1 to 3.

Entomological Society of Russia, St. Petersburg. Horæ, vi. part 3.

Imperial Society of Naturalists, Moscow. Bulletin 1868, ii. n. 4.

DUTCH NETHERLANDS:—

Royal Academy of Sciences, Amsterdam. Proceedings (Verslagen en Mededeelingen), Natural History section, Ser. 2, iii.—Minutes of General Meetings, May 1868 to April 1869.

Royal Zoological Society of Amsterdam. Contributions to Zoology (Bijdragen), part 9.

Botanical Museum of Leyden. Annales, completion of vol. iv.—Catalogue of the Botanical Museum, part 1, Flora Japonica.

BELGIUM:—

Royal Botanical Society of Belgium, Brussels. Bulletin, viii. n. 1, 2.

GERMANY:—

Natural-History Union of New Pomerania and Rugen. Transactions, i.

Royal Academy of Sciences, Berlin. Proceedings (Monatsberichte), July 1869 to Jan. 1870.

Royal Prussian Horticultural Society. *Journal (Wochenschrift) for 1869.

Silesian Society for the Education of the Fatherland, Breslau. Natural History and Medicine. Transactions, 1868–69.—Proceedings, xlvi., with Reports of the General Natural-History section, and of the Botanical and Entomological sections for 1868.

Imperial Academy of Sciences, Vienna. Proceedings (Sitzungsberichte), Natural History, lviii. parts 1 to 5; lix. parts 1, 2.—Mathematics &c., lviii. parts 2 to 5; lix. parts 1 to 3.—*Minutes of Meetings (Anzeiger), 1869.

Imperial and Royal Geological Institute, Vienna. *Transactions (Verhandlungen), 1869, n. 10.—*Journal (Jahrbuch), xix. n. 3.

Zoologico-botanical Society of Vienna. Transactions (Verhandlungen), xix. 1869.

Royal Academy of Sciences, Munich. *Proceedings (Sitzungsberichte), 1869, i. part 4; ii. parts 1, 2.

Senckenberg Society of Naturalists, Frankfort. Transactions (Abhandlungen), vii. parts 1, 2.

Physico-Medical Society of Würzburg. Transactions (Verhandlungen), new series, i. part 4.

Royal Society of Sciences, Göttingen. Transactions (Abhandlungen), xiv.—Proceedings (Nachrichten), 1869.

SWITZERLAND:—

Helvetic Society of Natural Sciences, Zurich. Memoirs (Neue Denkschriften), xxiii.

Vaudois Society of Natural Sciences, Lausanne. Bulletin, x. n. 62.

ITALY:—

Royal Academy of Sciences, Turin. Proceedings (Atti), iv.—*Minutes of Meetings (Sunti dei Lavori), 1859 to 1865.—*Meteorological and Astronomical Bulletin, 1868.

Royal University of Genoa. Transactions (Atti), i.

Technical Institute of Palermo. Journal of Natural and Economical Sciences, v. parts 3, 4.

PORTUGAL:—

National Museum of Lisbon. Catalogue of the Ornithological Collections, Psittaci and Accipitres.

FRANCE:—

Botanical Society of France. Bulletin, xvi. Extra Session, 1869; Bibliographical Review, D, E; Proceedings (Comptes Rendus des séances), n. 4, 5;—xvii. Bibliographical Review, A.

Entomological Society of France. Annals, Ser. 4, ix. (1869) part 1.

Imperial Society of Agriculture, Lyons. Annals of Physical and Natural Sciences, Ser. 3, viii.

Imperial Academy of Sciences, Lyons. Memoirs, xvii.

Linnean Society of Lyons. Annals, xvii.

Society of Physical and Natural Sciences, Bordeaux. *Memoirs, conclusion of vol. v.—*Minutes of Meetings, 1869.

Imperial Society of Natural Sciences, Cherbourg. Memoirs, xiii.

Linnean Society of Normandy, Caen. Bulletin, Ser. 2, i. ii.

EAST INDIA:—

Asiatic Society of Bengal. Journal, 1869.—*History &c., n. 3, 4. Natural History, 1869, n. 4.—Proceedings to Feb. 7, 1870.

AUSTRALASIA:—

New-Zealand Institute. Transactions and Proceedings, i. (1868).

Entomological Society of New South Wales, Sydney. Transactions, ii. part 1.

Royal Society of Tasmania, Hobarton. Proceedings, 1869.

SOUTH AMERICA:—

Public Museum of Buenos Ayres. Annals, part 6.

Society of Physical and Natural Sciences, Caraccas. *Vargasia, n. 6.

NORTH AMERICA:—

Academy of Natural Sciences, Philadelphia. Journal, New Series,

vi. parts 3, 4; vii.—Proceedings, 1868, 1869 to July.—American Journal of Conchology, v. parts 1, 2.

Museum of Comparative Zoology, Harvard College, Cambridge. Bulletin, n. 9 to 13.

Canadian Institute. Canadian Journal of Science, Literature, and History, xii. part 4.

Canadian Naturalist, New Series, iv.

GREAT BRITAIN AND IRELAND:—

British Association for the Advancement of Science. *Report of the Exeter Meeting, 1869.

Royal Society. Philosophical Transactions, clviii. part 2; clix. parts 1, 2.—Proceedings, xviii. n. 115 to 118.—Catalogue of Scientific Papers, iii.

Clinical Society. *Transactions, ii.

East-Indian Association. *Journal, iv. n. 1.

Entomological Society. Transactions, 1869, parts 5, 6; 1870, part 1.

Geological Society. *Quarterly Journal, xxv. part 4, xxvi. part 1.

Linnean Society. Transactions, xxvi. part 4, xxvii. part 1.—Journal, Zoology, x. n. 47; Botany, xi. n. 52.

Quckett Microscopical Club. *Journal, ii. parts 1, 2.

Royal Agricultural Society. *Journal, Ser. 2, vi. part 1.

Royal Asiatic Society. *Journal, New Ser. iv. part 2.

Royal Geographical Society. *Journal, lxxxix.; *Proceedings, xiii. n. 5, xiv. n. 1.

Royal Medical and Chirurgical Society. *Transactions, lii.; Proceedings, vi. n. 5.

Royal Microscopical Society. Monthly Microscopical Journal to May 1870.

Zoological Society. Transactions, vii. parts 1, 2; Proceedings, 1869, parts 2, 3.

Royal Society of Edinburgh. Transactions, xxv. part 2.—Proceedings, 1868–69.

Botanical Society of Edinburgh. Transactions, x. part 1.

Royal Geological Society of Ireland. Journal, xii. n. 2.

Berwickshire Naturalists' Club. Proceedings, 1866 to 1869.

Leeds Philosophical and Literary Society. Report, 1868–69.

Caradoc Field-Club. Transactions, 1868.

Woolhope Naturalists' Field-Club. Transactions, 1868.

Devonshire Association for the Advancement of Science, Literature, and Art. Report and Transactions, iii.

Plymouth Institution and Devon and Cornwall Natural-History Society. Transactions, iii. part 2.

To the Scientific Periodicals received by the Society, and enumerated above, p. v, must be added:—

Archiv für mikroskopische Anatomie. Quarterly, or nearly so. Purchased.

Giornale Botanico Italiano. Received in exchange.

The Biological papers contained in the above Transactions, Proceedings, and Journals, and the separate works added to the Library since the last Report, are as follows:—

Mammalia and General Zoology:—

— Allman. On anthropoid Apes in the Edinburgh Museum of Science and Art. Proc. Edinb. R. Soc. 1868–69.

J. F. Brandt. Researches on the genus *Hyrax*, especially as to the Anatomy, Affinities, and Geographical distribution, 3 plates. Mem. Imp. Acad. Sc. St. Petersb. xiv.

W. Breslauer. On the Development of the Ligamentous tissue. Archiv mikr. Anat. v.

G. Burmeister. Catalogue of the Mammifers of the Public Museum of Buenos Ayres.—Description of four species of Delphinidæ from the Argentine coast, 8 plates. Ann. Mus. Publ. Buenos Ayres, part 6.

E. D. Cope. On *Agaphelus*, a genus of toothless Cetacea. Proc. Acad. Nat. Sc. Philad. 1868.

E. Coues. A new *Arvicola* from Southern Arizona. Proc. Acad. Nat. Sc. Philad. 1868.

Duplessis and Combes. The Vertebrata of Orbe, Mammifera. Bull. Soc. Vaud. Sc. Nat. x.

L. F. Fitzinger. Revision of the Natural Family of Feles. Proc. Imp. Acad. Sc. Vienna, lviii. lix.

——. The genera of Antelopes and their natural allies. Proc. Imp. Acad. Sc. Vienna, lix.

W. H. Flower. Description of the Skeleton of *Delphinus sinensis*, 2 plates. Trans. Zool. Soc. vii.

W. H. Flower. On the Anatomy of *Proteles cristatus*, 1 plate and woodcuts.—On four specimens of the Common Fin-whale stranded on the south coast of England, 1 plate. Proc. Zool. Soc. 1869.

A. v. Frantzius. The Mammalia of Costa Rica. Wiegm. Archiv, xxxv.

J. E. Gray. Note on the young of the Spotted Hyæna, woodcuts.—On the Guemul or Roebuck of Southern Peru, woodcuts. Proc. Zool. Soc. 1869.

O. v. Grimm. The semicircular channels in the Cat. Bull. Imp. Acad. Sc. St. Petersb. xiv.

G. Gulliver. On the muscular sheath of the cardiac end of the œsophagus of the Aye-aye. Proc. Zool. Soc. 1869.

A. Günther. Record of Zoological Literature, iii. Purchased.

E. Hamilton. On a variety of *Canis vulpes* found in the Ardennes. Proc. Zool. Soc. 1869.

P. Harting. On the relative extent of wings, and weight of pectoral muscles, in flying vertebrated animals. Arch. Néerl. Sc. Exact. et Nat. Haarlem, iv.

J. Hector. List of bones of Seals and Whales in the Colonial Museum of Wellington, New Zealand. Ann. Nat. Hist. ser. 4, v.

T. H. Huxley. On the representatives of the malleus and the incus of Mammalia in other Vertebrata, woodcut. Proc. Zool. Soc. 1869.

A. Koschennikoff. On the prolongation of the axis-cylinder of the nerve-cells in the lesser brain of the Calf, ½ plate. Archiv mikrosk. Anat. v.

W. Koster. On the formation of eggs in the ovarium of Mammalia after birth. Proc. R. Acad. Sc. Amsterdam, Nat. Sc. Ser. 2, iii., and Arch. Néerl. Sc. Ex. et Nat. Haarlem, iv.

— Kupffer. The connexion of race between Ascidia and Vertebrata. Archiv mikrosk. Anat. v.

A. Macalister. On the myology of the Wombat (*Phascolomys wombata*) and the Tasmanian Devil (*Sarcophilus ursinus*), woodcut. Ann. Nat. Hist. Ser. 4, v.

A. W. Malm. On the Whale stranded in the Bohus district. Proc. R. Acad. Sc. Stockh. xxiii.

——. On a skeleton of *Balænoptera musculus*, Compan., from Finland, in the Zoological Museum of Stockhom, 1 plate. Proc. R. Acad. Sc. Stockh. xxv.

M. A. Milne-Edwards. On some Mammalia from Eastern Thibet (from the Comptes Rendus). Ann. Nat. Hist. Ser. 4, v.

J. Murie. Anatomy of the Lemuroidea, 6 plates. Trans. Zool. Soc. vii.

W. C. H. Peters. On some Mexican Amphibia. Proc. R. Acad. Sc. Berlin, 1869.

— Podcopaew. On the termination of the nerves in the epithelial layer of the skin, woodcuts. Archiv mikrosk. Anat. v.

L. Sabaneeff. Materials for the Fauna of the Government of Jaroslaff (cont.). Bull. Soc. Imp. Nat. Mosc. 1868, ii.

G. Saviotti. On the finer structure in the pancreas of animals, 2 plates. Archiv mikrosk. Anat. v.

C. M. Scammon. On the Cetaceans of the W. coast of N. America. Proc. Acad. Nat. Sc. Philad. 1869.

M. Schultze. On the termination of the nerves in the retina of the eye in Man and Animals, 1 plate. Archiv mikrosk. Anat. v.

P. L. Sclater. On *Macacus andamanensis* and *Perodicticus Potto*, woodcuts.—On *Phacochœrus Æliani*, 1 plate.—On *Ailurus fulgens*, woodcut.—On *Orycteropus capensis*, woodcut.—On two Mammals from the Zoological Society's Gardens, 1 plate. Proc. Zool. Soc. 1869.

B. Simpson. Note on *Ailurus fulgens*, 1 plate. Proc. Zool. Soc. 1869.

R. Swinhoe. On the Cervine Animals of the Island of Hainan, China, woodcuts. Proc. Zool. Soc. 1869.

T. H. Troschel. Report on the contributions to the Natural History of Mammalia during 1868. Wiegm. Arch. xxxv.

F. H. Welch. On *Lepus americanus*, woodcuts. Proc. Zool. Soc. 1869.

Ornithology :—

M. Allport. On the local distribution of some Tasmanian Animals. Proc. R. Soc. Tasmania, 1867.

J. V. Barboza du Bocage. New Birds of W. Africa, 1 plate. Proc. Zool. Soc. 1869.

G. E. Bulger. Note on the habits of *Myrmecocichla formicivora*, as observed near Windvogelberg, S. Africa. Proc. Zool. Soc. 1869.

W. Buller. Notes on Herr Finsch's Review of the Author's Essay on New-Zealand Ornithology.—On the Ornithology of New Zealand. Trans. New-Zealand Instit. i.

H. B. Butcher. List of Birds collected at Laredo, Texas, in 1866 and 1867. Proc. Acad. Nat. Sc. Philad. 1868.

Dr. Castro, of Para. Note on the Yapou, or Chéo-Chéo, *Cassius icteronotus*. Bull. Soc. Linn. Norm. Ser. 2, ii.

E. Coues. A monograph of Alcidæ.—List of Birds collected in Southern Arizona by F. Palmer. Proc. Acad. Nat. Sc. Philad. 1868.

P. Doderlein. Avifauna of the provinces of Modena, of Reggio, and of Sicily. Journ. Instit. Tecn. Palermo, v.

D. G. Elliot. Monograph of the genus *Pelecanus*. Proc. Zool. Soc. 1869.

O. Finsch. Notes on Mr. Buller's Essay on New-Zealand Ornithology (translation). Trans. New-Zeal. Instit. i.

O. Finsch and G. Hartlaub. On a small collection of Birds from the Tonga Islands. Proc. Zool. Soc. 1869.

J. Gould. Description of a supposed new Pigeon. Ann. Nat. Hist. Ser. 4, v.

——. On a new genus and species of *Trochilidæ*.—A new species of *Dacelo* from N.W. Australia. Proc. Zool. Soc. 1869.

G. R. Gray. Descriptions of new species of Birds from the Solomon and Banks's Groups of Islands. Ann. Nat. Hist. Ser. 4, v.

J. Haast. On the measurement of Dinornis-bones. Trans. New-Zeal. Instit. i.

G. Hartlaub. On *Anarhynchus*. Proc. Zool. Soc. 1869.

——. Report on the contributions to the Natural History of Birds during 1868. Wiegm. Archiv, xxxv.

C. Horne. Notes on *Meniceros bicornis* of India.—On *Ploceus Baya* and its nest. Proc. Zool. Soc. 1869.

F. W. Hutton. Notes on the Birds of Great and Little Barrier Islands. Trans. New-Zeal. Instit. i.

T. C. Jerdon. Notes on some new species of Birds from the N.E. frontier of India. Proc. Asiat. Soc. Beng. 1870.

G. N. Lawrence. Seven new American Birds. Proc. Acad. Nat. Sc. Philad. 1868.

W. V. Legge. On the habits of *Pedionomus torquatus*, Gould. Proc. Zool. Soc. 1869.

Lisbon National Museum. Catalogue of the Ornithological Collections: Psittaci and Accipitres. Presented by the Museum.

W. Meves. Contributions to the Ornithology of Sweden. Proc. R. Acad. Stockh. xxv.

W. v. Nathusius. On the structure of the egg-shell of the New-

Zealand Moa, and the systematic value of the structure of egg-shells, 1 plate. Zeitschr. wiss. Zool. xx.

A. and E. Newton. On the Osteology of the Solitaire, *Pezophaps solitaria*, Gmel., 10 plates. Phil. Trans. R. Soc. clix.

R. Owen. On *Dinornis*, parts 13, 14. 10 plates. Trans. Zool. Soc. vii.

W. K. Parker. On the structure and development of the skull in the common Fowl, 7 plates. Phil. Trans. R. Soc. clix.

E. P. Ramsay. On the Cuckoos of the neighbourhood of Sydney and their foster-parents, 1 plate. Proc. Zool. Soc. 1869.

R. Ridgway. Notices of obscurely known American Birds. Proc. Acad. Nat. Sc. Philad. 1869.

J. Salvadori. Notes on some Birds of Costa Rica. Proc. (Atti) Acad. Sc. Turin, iv.

P. L. Sclater. On the species of the genus *Micrastur*.—A new Mexican Wren, 1 plate.—On the breeding of Birds in the Zoological Society's Gardens during the last 20 years.—On two new species of *Synallaxis*, 1 plate. Proc. Zool. Soc. 1869.

P. L. Sclater and O. Salvin. On Venezuelan Birds collected by Mr. A. Goering, 1 plate.—On Mexican Birds collected by Mr. H. S. le Strange.—New American Birds, 1 plate.—On two Birds collected by Mr. E. Bartlett in Eastern Peru, 1 plate.—Three new species of Tanagers from Veragua, 2 plates.—On Peruvian Birds collected by Mr. Whitely, part 5.—Third List of Birds collected at Conchitas, Argentine Republic, by Mr. W. H. Hudson. Proc. Zool. Soc. 1869.

R. B. Sharpe. On the genus *Alcyone*.—Additional notes on the genus *Ceyx*.—On the Birds of Angola, 1 plate.—On a new *Tanysiptera*. Proc. Zool. Soc. 1869.

C. Smith. The Birds of Somersetshire, 1 vol. 8vo. Presented by the Author.

C. J. Sundevall. Conspectus of Picine Birds. Presented by the Royal Academy of Sciences, Stockholm.

R. Swinhoe. Two new Sun-birds from Hainan Island, S. China, Ann. Nat. Hist. Ser. 4, iv.

——. Three new Birds from China. Ann. Nat. Hist. Ser. 4, v.

Visct. Walden. New Birds from Southern Asia. Ann. Nat. Hist. Ser. 4, v.

J. v. Wickevoort Crommelin. Notes on the Ornithological Fauna of the Netherlands, 2 papers. Archiv Néerl. Sc. Exact. et Nat. iv.

Ibis, Nos. 20 to 22. Purchased.

ICHTHYOLOGY :—

M. Allport. On the local distribution of some Tasmanian animals. Proc. R. Soc. Tasm. 1867.

——. Reports on the introduction of Salmon and Sea-trout Ova into Tasmania. Proc. R. Soc. Tasm. 1869.

P. Bleeker. On the species confounded under the name of *Genyoroge benghalensis*, Günth.—A new *Cæsio* from the Isle of Nossibé.—A new *Chætopterus* from Amboina.—A new *Glyphidodon* from Réunion Island.—Two new species of *Alticus* from Madagascar.—Ninth Notice of the Ichthyological Fauna of Japan.—A new *Platycephalus*, 1 plate. Proc. R. Acad. Sc. Amsterdam.

J. F. Brandt. On the Europeo-Asiatic Sturionides. Bull. Imp. Acad. Sc. St. Petersb. xiv.

W. B. Carpenter. Description of some peculiar Fish's Ova. Monthl. Microsc. Journ. iii.

E. D. Cope. On the distribution of Freshwater Fishes in the Alleghany region of S.W. Virginia, 3 plates. Journ. Acad. Nat. Sc. Philad. New Ser. vi.

F. Day. On the Fishes of Orissa, 2 papers.—On some Fishes of the Indian Museum, 2 papers.—On the Freshwater Fishes of Burma. Proc. Zool. Soc. 1869.

A. Duméril. On the presence of peculiar Organs in the Rays of the genus *Cephaloptera* (from the Comptes Rendus). Ann. Nat. Hist. Ser. 4, v.

R. N. Dybowski. On the Fish-fauna of the river Onon, and of the Ingoda in Transbaikalia. Trans. Zool. Bot. Soc. Vienna, xix.

— Guichenot. On *Nesobastes* from Australia, *Periolophus* from the Indian Ocean, *Salarychthys* from Brazil, and *Lophiopsis* from the Cape, four new genera of fishes. Mem. Soc. Imp. Sc. Nat. Cherbourg, xiii.

G. Gulliver. On some nondescript Bones in the skull of Osseous fishes. Ann. Nat. Hist. Ser. 4, iv.

A. Günther. Report of a second collection of Fishes made at St. Helena, by J. C. Melliss, 1 plate.—On some Fishes from the Peruvian Amazons, woodcuts.—Contributions to the Ichthyology of Tasmania. Proc. Zool. Soc. 1869.

T. W. Jones. On the Caudal Heart of the Eel, 1 plate. Phil. Trans. R. Soc. clviii.

H. Jouan. On some Noxious Fishes from Japan.—On some Marine Fishes of Hong Kong. Mem. Soc. Imp. Sc. Nat. Cherbourg, xiii.

A. Kner. New Fishes from the Museum of Godeffroy and Son, of Hamburg, 2 papers, 9 plates. Proc. Imp. Acad. Sc. Vienna, Nat. Hist. lviii.

A. Kowalewski, P. Owsiannikow, and N. Wagner. On the generation of Sturgeons. Bull. Imp. Acad. Sc. St. Petersb. xiv.

A. W. Malm. On the development and structure of Pleuronectidæ, 2 plates. Trans. R. Acad. Sc. Stockh. New Ser. vii.

A. F. Malmgren. Contributions to the Fish-fauna of Iceland. Proc. R. Acad. Sc. Stockh. xxiv.

J. Norris. On a new *Osmerus* from the Schuylkill. Proc. Acad. Nat. Sc. Philad. 1868.

P. Owsiannikow. On the generation of *Petromyzon fluviatilis*. Bull. Imp. Acad. Sc. Petersb. xiv.

W. C. H. Peters. New or little-known Fishes from the Berlin Museum. Proc. R. Acad. Sc. Berlin, 1869.

R. L. Playfair. Contributions to the Ichthyology of Zanzibar. Proc. Zool. Soc. 1869.

— Reineck. On the arrangement in layers of the Trout-spawn, 1 Plate. Archiv mikrosk. Anat. v.

F. Steindachner. The Gymnotidæ of the Imperial Cabinet of Natural History of Vienna. Proc. Imp. Acad. Sc. Vienna, Nat. Hist. lviii.

F. H. Troschel. Report on the contributions to Ichthyology during 1868. Wiegm. Archiv, xxxv.

Erpetology:—

E. D. Cope. On the Reptilia and Batrachia obtained in the Orton Expedition to Equador and the Upper Amazon.—On the Crocodilian genus *Perosuchus*.—Sixth contribution to the Herpetology of Tropical America.—On the Reptiles of the Old World, part 2. Proc. Acad. Nat. Sc. Philad. 1868.

E. Coues. Two new Snakes from Southern Arizona. Proc. Acad. Nat. Sc. Philad. 1868.

A. Goette. Researches on the development of *Bombinator igneus*, 2 plates. Archiv mikrosk. Anat. v.

A. Golubaew. On the structure and development of the capillary vessels of the Frog, 1 plate. Archiv mikrosk. Anat. v.

J. E. Gray. On the families and genera of Tortoises, 1 plate, woodcuts.—*Mauremys laniaria*, a new freshwater Tortoise, 1 plate. —Description of *Emys flavipes*, 1 plate. Proc. Zool. Soc. 1869.

A. Günther. Report on two collections of Indian Reptiles, 3 plates, woodcuts. Proc. Zool. Soc. 1869.

H. Jouan. On some Reptiles from Pulo Condor and Lower Cochin China. Mem. Soc. Imp. Sc. Nat. Cherbourg, xiii.

G. Krefft. New Australian Snakes, woodcuts. Proc. Zool. Soc. 1869.

C. Langer. On the lymphatic-vessel system in the Frog, 1 plate. Proc. Imp. Acad. Sc. Vienna, lviii.

A. Ljungman. On some new Ophiuridæ. Enumeration of the living Ophiuridæ hitherto known. Proc. R. Acad. Stockholm, xxiii.

— Marius and Van Loir. Experimental researches on the anatomical and functional regeneration of the spinal cord in Frogs, 1 plate. Monthl. Microsc. Journ. iii.

St. G. Mivart. On the myology of *Menopoma alleghaniense*, woodcuts.—On the classification of Anurous Batrachians.—On the myology of *Menobranchus lateralis*, woodcuts. Proc. Zool. Soc. 1869.

V. Payot. Erpetology of the neighbourhood of Mont Blanc. Ann. Sc. Phys. Nat. Soc. Imp. Agric. Lyons, Ser. 3, viii.

W. C. H. Peters. On *Phyllodactylus galapagensis*, a new Lizard from the Galapagos.—On new Saurians and Batrachians. Proc. (Monatsber.) R. Acad. Sc. Berlin, 1869.—On the ductus pneumaticus of the lower jaw in Crocodiles. Ibid. 1870.

— Stoliczka. Observations on *Chameleo vulgaris*. Journ. Asiat. Soc. Bengal, 1870.

A. Strauch. Synopsis of Viperidæ, with detailed geographical distribution, 2 plates. Mem. Imp. Acad. Sc. Petersb. xiv.

— Tolotschnikoff. On the relation of the nerves to the smooth muscle-fibres in the bladder of the Frog. Archiv mikrosk. Anat. v.

F. H. Troschel. Report on the contributions to Herpetology during 1868. Wiegm. Archiv, xxxv.

MOLLUSCA :—

Amsterdam Zoological Society's Museum. Catalogue of Shells. Bijdr. Tot. Dierk. part 9.

H. Adams. New marine Shells, 1 plate. Proc. Zool. Soc. 1869.

G. F. Angas. Eight new species of *Helicidæ* from the Western Pacific Andes, 1 plate. Proc. Zool. Soc. 1869.

R. Bergh. Anatomy of *Pleurophyllidia formosa*, 3 plates. Trans. Zool. Bot. Soc. Vienna, xix.

W. T. Blanford. New Land and Freshwater Mollusca from Upper Burma and Yunan.—On the species of *Hyrax* inhabiting Abyssinia and the neighbouring countries. Proc. Zool. Soc. 1869.

J. Brazier. Notes on the localities of two species of Land Shells and three species of Volutes.—List of species of *Conus* found in Port Jackson. Proc. Zool. Soc. 1869.

J. C. Cox. Three new Marine Australian Shells, 1 plate. Proc. Zool. Soc. 1869.

E. Deslongchamps. On some Marine Mollusca observed at Luc. Bull. Soc. Linn. Norm. Ser. 2, ii.

W. Fleming. On the hair-bearing sense-cells of the epidermis of Mollusca, 1 plate. Archiv mikrosk. Anat. v.

G. v. Frauenfeld. Contributions to the Fauna of the Nicobar Islands. Trans. Zool. Bot. Soc. Vienna, xix. Also separate copies presented by the author.

G. E. Fryer. Contributions to the knowledge of Pelagic Mollusca, 1 plate. Journ. Asiat. Soc. Bengal, 1869.

C. Hartman. Land and Freshwater Mollusca from the eastern environs of Stockholm. Proc. R. Acad. Sc. Stockholm, xxiii.

J. Gwyn Jeffreys. A new British Land Shell. Ann. Nat. Hist. Ser. 4, v.

W. Keferstein. On the anatomy and history of the development of some Marine *Planaria* from St. Malo. Trans. R. Soc. Sc. Göttingen, xiv.

H. de Lacaze-Duthiers. Morphological researches on Mollusca (from the Comptes Rendus). Ann. Nat. Hist. Ser. 4, v.

J. Lea. New Unionidæ, Melanidæ, &c. chiefly from the United States, 25 plates. Journ. Acad. Nat. Sc. Philad. New Ser. vi.

——. Nine Unionidæ from Lake Nicaragua.—Sixteen new species of *Unio* of the United States.—On some singular forms of Chinese species of *Unio*.—Four new exotic Unionidæ.—Twenty-six new Melanidæ of the United States.—Seven new species of *Unio* from North Carolina.—Two new Unionidæ from Ecuador.—Melanidæ of the United States.—Six new Freshwater Shells. Proc. Acad. Nat. Sc. Philad. 1868, 1869.

E. Lindström. On the recent Mollusca of Gothland, 3 plates. Presented by the Royal Academy of Sciences, Stockholm.

——. On the genus *Trimerella*, Billings, of Brachiopoda, 1 plate. Proc. R. Acad. Sc. Stockholm, xxiv.

W. Marshall. On the natural history of Chitons, 1 plate. Arch. Néerl. Sc. Exact. et Nat. iv.

V. Payot. Malacology of the neighbourhood of Mont Blanc. Ann. Sc. Phys. Nat. Soc. Imp. Agric. Lyons, ser. 3, viii.

H. Pearse. On the classification of the Helicterina. Proc. Zool. Soc. 1869.

C. Semper. On a new Australian genus of *Testacellida*, woodcut. Zeitschr. wiss. Zool. xix., translated in Ann. Nat. Hist. Ser. 4, v.

G. B. Sowerby. Thesaurus Conchyliorum, parts 26 to 28. Purchased.

F. H. Troschel. Report on the contributions to the natural history of Mollusca during 1868. Wiegm. Archiv, xxxv.

C. A. Westerlund. Malacological observations made in a tour through Blekin, Kalmor district, and Öland in 1865. Proc. R. Acad. Stockholm, xxii.

G. F. Whiteaves. On the Marine Mollusca of Eastern Canada. Canad. Naturalist, iv.

Journal de Conchyliologie, Ser. 3, x. n. 1, 2. Malakozoologische Blätter, to Dec. 1869, and American Journal of Conchology, Philadelphia, v. parts 1, 2.

See also papers on Deep-sea Dredgings under Lower Animals.

CRUSTACEA AND ARACHNIDA:—

— Balbiani. On the constitution and mode of formation of the ovum of the *Sacculinæ* (from the Comptes Rendus). Ann. Nat. Hist. Ser. 4, v.

G. Bellucci. On the food and sleep of Tritons, and the reproduction of their amputated members. Proc. R. Ac. Sci. Turin, iv.

J. Blackwall. A new species of *Epëira*. Ann. Nat. Hist. Ser. 4, iv.

——. Spiders collected by Prof. E. P. Wright near Lucca, 2 plates. Journ. Linn. Soc. Zool. x.

O. P. Cambridge. Nietner's Ceylon *Araneida*, with several new species and one new genus.—Two new species and a new genus of *Araneida*. Journ. Linn. Soc. Zool. x.

——. On some Spiders and Scorpions from St. Helena, with descriptions of new species, 1 plate. Proc. Zool. Soc. 1869.

A Dohrn. Researches on the structure and development of Arthropoda: *Praniza maxillaris*, 3 plates, *Paranthura costana*, 1 plate. —On the structure and development of *Arthropoda*.—Six new *Decapoda Loricata*, 1 plate. Zeitschr. wiss. Zool. xx.

G. Eisen and A. Stuxberg. New Myriapoda described in an account of the Sand Island of Gothland. Proc. R. Acad. Sc. Stockh. xxv.

A. Goës. Amphipodous Crustacea of the Sea of Spitzbergen, with some other Arctic species, 6 plates. Proc. R. Acad. Sc. Stockh. xxii.

E. Grube. Descriptions of *Arachnoidea*, *Pycnogonoidea*, and Crustacea from St. Vaast (Brittany). Trans. Siles. Soc. Nat. Hist. 1868–69.

A. Humbert and H. de Saussure. Descriptions of Myriapodà from the Museum at Vienna. Trans. Zool. Bot. Soc. Vienna, xix.

H. Jouan. On some Crustacea from Pulo Condor and Lower Cochin China. Mem. Soc. Imp. Sc. Nat. Cherbourg, xiii.

J. A. Lyttkens. Contributions to the Anatomy of Crustacea. Trans. Univ. Lund, 1868.

J. D. Macdonald. On an apparently new species of minute parasitic Cirripeds, 2 plates. Proc. Zool. Soc. 1869.

S. J. MacIntyre. The structure of the scales of certain *Thysanura*, 1 plate. Monthl. Microsc. Journ. iii.

E. Metschnikow. On a larva-stage of *Euphausia*, 1 plate. Zeitschr. wiss. Zool. xix.

J. Munter and — Buchols. On *Balanus improvisus*, Darw., 2 plates. Trans. Nat. Hist. Un. New Pomer. i.

R. Ollson. Prodromus of a fauná of parasitical *Copepoda* of Scandinavia, 2 plates. Trans. Univ. Lund, 1868.

J. R. Pigott. The markings of the *Podura*-scales. Monthl. Microsc. Journ. iii.

F. Plateau. Researches on the freshwater Crustacea of Belgium. Ann. Nat. Hist. Ser. 4, v.

M. Schultze. The ridges in the retina of *Cephalopoda* and *Heteropoda*, 2 plates. Archiv mikrosk. Anat. v.

F. Stoliczka. Contributions to the knowledge of Indian *Arachnoidea*, 3 plates. Journ. Asiat. Soc. Bengal, 1869.

T. Thorell. On *Aranea lobata*, Pal. Proc. R. Acad. Sc. Stockh. xxiv.

E. P. Wright. On a new species of *Pennella*, 1 plate. Ann. Nat. Hist. Ser. 4, 5.

See also papers on Deep-sea Dredgings under Lower Animals.

ENTOMOLOGY :—

C. H. Boheman. The Insect-fauna of Spitsberg, 1 plate. Proc.

R. Acad. Sc. Stockh. xxii.—Contributions to the Insect-fauna of Gothland. Ibid. xxiv.

F. Brauer. Descriptions of new *Neuroptera* from the Museum Godeffroy in Hamburg.—On the metamorphoses of Insects, with reference to the theory of descent, 1 plate.—A new species of *Iapyx*, Hallid.—Contributions to the Biology of *Acrocerida*.—On the metamorphoses of *Mantispa styriaca*, Pod., 1 plate.—On the larvæ of *Diptera* in connexion with Schiner's new system.—On the metamorphoses of *Hæmatoptera pluvialis*. Trans. Zool. Bot. Soc. Vienna, xix.

A. G. Butler. List of a small collection of Butterflies from the South Seas.—On new Diurnal Lepidoptera. Ann. Nat. Hist. Ser. 4, v.

J. A. Chapman. On the parasitism of *Rhipiphorus paradoxus*. Ann. Nat. Hist. Ser. 4, v.

F. Cohn. Researches on the ravages committed by Insects on the cornfields in the summer of 1869. Trans. Siles. Soc. Nat. Hist. 1868-69.

M. A. Fauvel. Memoir on the *Staphylinida* of Chile, ½ plate.—Catalogue of New-Caledonian Coleoptera, ½ plate. Bull. Soc. Linn. Norm. Ser. 2, i.—The Gallo-Rhenan Coleopteran Fauna, Introduction, 4 plates. Ibid. ii.

R. Felder. Diagnoses of Lepidoptera collected by H. v. Hedemann in Mexico. Trans. Zool. Bot. Soc. Vienna, xix.

J. A. Count Ferrari. Three new W. Asiatic Beetles. Trans. Zool. Bot. Soc. Vienna, xix.

F. X. Fieber. Synopsis of European *Deltocephala*, 2 plates. Trans. Zool. Bot. Soc. Vienna, xix.

Prof. Förster. On Gall-wasps. Proc. Zool. Bot. Soc. Vienna, xix.

M. Ganin. On the embryonal covering in the embryos of Hymenoptera and Lepidoptera. Mem. Imp. Acad. Sc. Petersb. xiv.

O. v. Grimm. On the apparatus for closing the stigmata in *Periplaneta orientalis*.—Anatomical researches on the antennæ of Insects. Bull. Imp. Acad. Sc. Petersb. xiv.

R. E. Guérin-Méneville. Revue de Sériculture comparée, 4 vols. 8vo. 1863-1866. Presented by Capt. Lendy.

H. Kawall. Nine new *Ichneumonida* from Curonia. Bull. Soc. Imp. Nat. Mosc. 1868, ii.

W. C. Kindberg. Observations on the Diurnal Lepidoptera of East Gothland. Proc. R. Acad. Sc. Stockh. xxiv.

F. Kowarz. Contributions to the Diptera-fauna of Hungary. Trans. Zool. Bot. Soc. Vienna, xix.

J. Kriechbaumer. Hymenopterological contributions. Trans. Zool. Bot. Soc. Vienna, xix.

J. L. Leconte. Analytical table of the species of *Baridius* inhabiting the United States.—The *Gyrinidæ* of N. America north of Mexico.—On the species of *Agonoderus*, *Bradycellus*, and *Stenolophus* inhabiting America north of Mexico. Proc. Acad. Nat. Sc. Philad. 1868.

——. List of Coleoptera collected in Vancouver's Island by H. and J. Matthews, with descriptions of new species. Ann. Nat. Hist. Ser. 1, iv.

B. T. Lowne. The anatomy and physiology of the Blow-fly (*Musca vomitoria*, Linn.), 8vo, 10 plates. Presented by the Author.

——. On the structure of the cornea of the Bee. Journ. Quek. Microsc. Club, ii.

A. Macalister. On *Gyropus dicotylis*, a new parasite, woodcut. Proc. Zool. Soc. 1869.

J. Mann. Lepidoptera collected in Dalmatia. Trans. Zool. Bot. Soc. Vienna, xxix.

E. Marno. The types of the larvæ of Diptera in support of the new system of Diptera. Trans. Zool. Bot. Soc. Vienna, xiv.

J. W. Meigen. Systematical description of the European Diptera, 7 vols., with an eighth or supplemental vol. by H. Loew. Purchased.

J. Mik. Contributions to the Diptera-fauna of Austria, 1 plate. Trans. Zool. Bot. Soc. Vienna, xix.

P. Millière. Figures and descriptions of unpublished Caterpillars and Lepidoptera, 4 plates. Ann. Soc. Linn. Lyons, xvii.

— Mulsant. Monograph of Longicornes. Ann. Sc. Phys. Nat. Imp. Agr. Soc. Lyons, Ser. 3, viii.

——. Monograph of *Coccinellida* (conclusion). Mem. Imp. Acad. Sc. Lyons, xvii.

— Mulsant and — Rey. Monograph of Coleoptera of the tribe of *Piluliformia*, 2 plates. Ann. Soc. Linn. Lyons, xvii.

A. Murray. On the relations between Wasps and *Rhipiphori*. Ann. Nat. Hist. Ser. 1, v.

J. Palm. Contributions to the Diptera-fauna of Tyrol. Trans. Zool. Bot. Soc. Vienna, xix.

F. P. Pascoe. Contributions to the knowledge of *Curculionidæ*. Journ. Linn. Soc. Zool. x.

——. Additions to the *Tenebrionidæ* of Australia. Ann. Nat. Hist. Ser. 4, v.

J. E. Planchon and J. Lichtenstein. On *Phylloxera*, the new disease attacking the vine. 8vo. Presented by the Authors.

T. Reakirt. New species of Diurnal Lepidoptera. Proc. Acad. Nat. Sc. Philad. 1868.

A. S. Ritchie. On the Coleoptera of the island of Montreal.—Notes on *Pieris Rapæ*. Canadian Naturalist, New Ser. iv.

A. Rogenhofer. On Hermaphrodites in *Rhodocera*.—Lepidopterological communications. Trans. Zool. Bot. Soc. Vienna, 1869.

J. R. Schiner. *Alophora Kriechbaumeri*, a new Phasia from Tyrol. Trans. Zool. Bot. Soc. Vienna, 1869.

L. E. Schulze. On cuticular formations and the induration of epithelium-cells in Articulate Animals, 2 plates. Archiv mikrosk. Anat. v.

D. Sharp. On the species of *Philhydrus* found in the Atlantic islands. Ann. Nat. Hist. Ser. 4, v.

C. Th. v. Siebold. On parthenogenesis in *Polistes gallica*.—On pædogenesis in the *Strepsiptera*. Zeitschr. wiss. Zool. xx.

F. Smith. On the parasitism of *Rhipiphorus paradoxus*. Ann. Nat. Hist. Ser. 4, iv. v.

H. T. Stainton. The *Tineina* of Southern Europe, 1 vol. Presented by the Author.

C. Stål. New or little-known *Bryozoa*.—Hemiptera Africana, I. to IV., 1 plate.—Contributions to the knowledge of *Reduviidæ*.—Contributions to the systematics of Hemiptera.—Synopsis of the *Saldæ* of Sweden,—of the *Hydrobatidæ* of Sweden. Proc. R. Acad. Sc. Stockh. xxii. to xxv.

G. Stierlin and V. v. Gautard. The Coleopterous Fauna of Switzerland. Mem. Helv. Soc. Sc. Zurich, xxiii.

C. G. Thomson. Entomological Observations made in a tour in Scania in 1866, with descriptions of new species. Proc. R. Acad. Sc. Stockh. xxiv.

J. Watson. Further remarks on the plumules or battledore-scales of some of the Lepidoptera. Monthl. Microsc. Journ. ii.

J. Winnertz. Seven new species of *Sciara*. Trans. Zool. Bot. Soc. Vienna, xix.

H. Wegenbergh, jun. Two new Diptera, 1 plate. Arch. Néerl. Sc. Ex. et Nat. Haarlem, iv.

T. V. Wollaston. The Coleoptera of St. Helena.—Additions to the Coleopterous fauna of the Cape-Verd Islands. Ann. Nat. Hist. Ser. 4, v.

Horæ Societatis Entomologicæ Rossicæ, 6 parts. Entomological Society's Transactions, 1870, part 1. Entomologists' Monthly Magazine to May 1870.

Lower Animals:—

A. Agassiz. Preliminary Report on *Echini* and Starfishes dredged in deep water between Cuba and the Florida Reef by L. F. de Pourtales. Bull. Mus. Comp. Zool. Harv. Coll. 9.

L. Agassiz. Report upon deep-sea dredgings in the Gulf-stream during the third cruise of the U.S. steamer 'Bibb.' Bull. Mus. Comp. Zool. Harv. Coll. 13.

E. J. Allman. On *Rhabdopleura*, a new genus of *Polyzoa*. Proc. R. Soc. Edinb. 1868–69.

Note on *Polytrema miniaceum*. Ann. Nat. Hist. Ser. 4, v.

W. Baird. New suctorian Annelida.—Further remarks on *Megascolex diffringens*. Proc. Zool. Soc. 1869.

J. S. Bowerbank. Monograph of siliceo-fibrous Sponges, 5 plates. —On Dr. Gray's genus *Theonella*. Proc. Zool. Soc. 1869.

H. J. Carter. Notes on the Sponges *Grayella*, *Osculina*, and *Cliona*. —On two new species of the Foraminiferous genus *Squamulina*, and on a new species of *Difflugia*, 2 plates. Ann. Nat. Hist. Ser. 4, v.

W. B. Carpenter. On the separation of the species of *Echinida*, 1 plate. Monthly Microsc. Journ. iii.

E. Claparède. Histological researches on *Lumbricus terrestris*, Linn., 6 plates. Zeitschr. wiss. Zool. xix.

C. Cubitt. Observations on some points of the economy of *Stephanoceros*, 1 plate. Monthly Microsc. Journ. iii.

V. Czerny. Observations on *Amœbas*. Archiv mikrosk. Anat. v.

M. Duncan. On the *Madreporaria* dredged up in the Expedition of H.M.S. 'Porcupine.' Proc. R. Soc. xviii., and Ann. Nat. Hist. Ser. 4, v.

Duplessis and Combe. On the accidental injection of the gastrovascular system in *Clepsine complanata*, 1 plate. Bull. Soc. Vaud. Sc. Nat. x.

E. Eisig. Description of a *Filaria* from *Halmaturus*.—*Nereis hircinicola*, 1 plate. Zeitschr. wiss. Zool. xx.

F. A. Forel. Introduction to the study of the deep-water fauna of Lake Leman. Bull. Soc. Vaud. Sc. Nat. x.

— Fürstenberg. On the Miescher's, or Prosospermum-channels, woodcuts. Trans. Nat. Hist. Un. Pomer. i.

J. E. Gray. Note on *Myriosteon Higginsii*. Ann. Nat. Hist. Ser. 4, v.

A. Greef. On freshwater Radiolaria and Radiolaria-like *Rhizopoda*, 2 plates. Archiv mikrosk. Anat. v.

——. *Protohydra Leuckartii*, a new race-form of *Cœlenterata*, 2 plates. Zeitschr. wiss. Zool, xx.

H. Grenacker. Some observations on *Rotatoria*, 1 plate. Zeitschr. wiss. Zool. xix.

——. On *Actinophrys Sol* (*Radiolaria*). Trans. Phys. Med. Soc. Würzb. New Ser. i.

E. Grube. On the Annelid fauna of St. Vaast (Brittany). Trans. Siles. Soc. Nat. Hist. 1868–69.

E. Hæckel. On Crambessida, a new family of Medusæ of the group of Rhizotoms, 2 plates. Zeitschr. wiss. Zool. xix.

——. On the Organization of Sponges and their relationship to the Corals.—Prodromus of a system of Calcareous Sponges (both papers from the 'Jenaische Zeitschr.'). Ann. Nat. Hist. Ser. 4, v.

J. A. Herklots. Echinoderms figured from Nature, from the drawings of the Royal Museum of Leyden, 10 plates. Bijdr. Dierk. R. Soc. Zool. Amsterdam, 9.

F. Hincks. On some interesting points in the history of Polyzoa. Pop. Sci. Rev. ix.

J. Hogg. On *Cercariæ* parasites on *Lymnæa stagnalis*, 1 plate. Monthl. Microsc. Journ. iii.

J. G. Jeffreys. Last Report on Dredging among the Shetland Islands. Separate copy presented by the Author.

M. Johnson. The polymorphic character of the products of development of *Monas Lens*. Journ. Quek. Microsc. Club, iii.

J. G. H. Kinberg. New Annelida. Proc. R. Acad. Sc. Stockh. xxii., xxiii.—On the regeneration of the head and anterior segments of an Annelid. Ibid. xxiv.

W. S. Kent. On a new genus of *Madreporaria*, or Stony Corals. —On the relationship of the Sponges to the Corals.—On a new *Sagitta* from the S. Pacific. Ann. Nat. Hist. Ser. 4, v.

——. On the calcareous spiculæ of the Gorgonaceæ, 2 plates. Monthly Microsc. Journ. iii.

—. Knoch. On the embryology of *Bothriocephalus latus*. Bull. Imp. Acad. Petersb. xiv.

A. Kölliker. Anatomico-systematical description of *Alcyonaria*. Trans. Senckenb. Soc. Nat. Francf. vii.

A. Krohn. On the earliest formation of the stems of *Botryllus*, 1 plate. Wiegm. Archiv, xxxv.

J. Leidy. On some American Leeches. Proc. Acad. Nat. Sc. Philad. 1868.

S. Lovén. On *Phanogenia*, a new genus of free *Crinoidea*. Proc. R. Acad. Stockh. xxiii.—On *Leskia mirabilis*, Gray. Ibid. xxiv.—On a remarkable species of *Spongia* living in the N. Sea, 1 plate. Ibid. xxv. Also a separate copy, presented.

T. Lyman. Preliminary report on Ophiuridæ and Astrophytidæ dredged in deep water between Cuba and the Florida reef by L. F. de Pourtales. Bull. Mus. Comp. Zool. Harv. Coll.

W. C. MacIntosh. On the style-region of the Ommatoplean proboscis, 1 plate. Monthl. Microsc. Journ. iii.

——. On the structure of British Nemerteans and some new British Annelids, 13 plates. Trans. R. Soc. Edinb. xxv.

A. J. Malmgren. Northern marine Annelids, 12 plates. Proc. R. Acad. Sc. Stockh. xxii. The polychætous Annelids of Spitzberg, Greenland, Iceland, and Scandinavia hitherto known, 14 plates. Ibid. xxiv.

E. Metschnikoff. Researches on the metamorphoses of some Marine Animals. Zeitschr. wiss. Zool. xx., and Proc. R. Soc. Sc. Göttingen (Nachrichten), 1869.

——. Embryological researches on *Gyrodactylus*. Bull. Imp. Acad. Sc. Petersb. xiv.

H. Nitsche. Contributions to the knowledge of *Bryozoa*, 3 plates. Zeitschr. wiss. Zool. xx.

E. Parfitt. On spontaneous generation.—On the *Protozoa* of Devonshire. Trans. Dev. Assoc. Sc. Lit. and Art, iii.

——. Experiments on spontaneous generation, 1 plate. Monthl. Microsc. Journ. ii.

G. Pouchet and A. Myèvre. On the anatomy of the *Alcyonaria* (from the Comptes Rendus). Ann. Nat. Hist. Ser. 4, v.

L. F. de Pourtales. List of the Crinoids obtained on the coasts of Florida and Cuba.—List of the Holothuridæ from the deep-sea dredgings of the U. S. coast-survey. Bull. Mus. Comp. Zool. Harv. Coll.

A. Quennerstedt. Notes on Animal Life in the Frozen Sea between Spitzberg and Greenland, 3 plates. Trans. R. Acad. Sc. Stockh. vii.

J. Reincke. On the sexual relations of *Saprolegnia monoica*, 1 plate. Archiv mikrosk. Anat. v.

A. Sanders. On an undescribed stage of development of *Tetrarhynchus corollatus*, 1 plate. Monthl. Microsc. Journ. iii.

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F. A. Smitt. On the development and gelatinous bodies of marine Bryozoa, 7 plates. Proc. R. Acad. Stockh. xxii.—Critical enumeration of the marine Bryozoa of Scandinavia. Ibid. xxii. 1 plate, xxiii. 11 plates, xxiv. 10 plates.—Enumeration of the marine Bryozoa of arctic and northern regions. Ibid. xxiv.

J. G. Tatem. Contributions to the teratology of Infusoria. Monthl. Microsc. Journ. iii.

T. Wyville Thomson. On *Holtenia*, a genus of vitreous sponges, 1 plate. Phil. Trans. R. Soc. clix.

C. S. Wade. The development of organisms in organic infusions. Monthl. Microsc. Journ. ii., iii.

J. F. Whiteaves. On some results obtained by dredging in Gaspé and off Murray Bay. Canad. Naturalist, New Ser. iv.

R. v. Willemoes-Suhm. Helminthological notes, n. s., 1 plate. Zeitschr. wiss. Zool. xx.

A. Wrzeniowski. Contributions to the Anatomy of Infusoria, 2 plates. Archiv mikrosk. Anat. v.

PHÆNOGAMIC BOTANY :—

N. J. Andersson. Monographia Salicum, 5 plates. Trans. R. Acad. Sc. Stockh. vi.

——. A new *Colpodium* from Spitzberg, 1 plate. Proc. R. Acad. Sc. Stockh. xxiii.

P. Ascherson. On *Bidens radiatus*. Bot. Zeit. 1870.

H. Baillon. Histoire des Plantes, i. and ii., parts 1–4. Purchased.

J. G. Baker. Monograph of British Roses. Journ. Linn. Soc. Bot. xi.

——. Review of the genus *Narcissus*. Seem. Journ. Bot. viii.

J. H. Balfour. On *Hieracium collinum*, new to Britain, 1 plate. Trans. Bot. Soc. Edinb. x.

O. Beccari. New Bornean plants, Balanophoreæ, 4 plates, Rafflesiaceæ. N. Giorn. Bot. Ital. i.—Aristolochieæ and allied genera, 3 plates.—Note on the embryo of Dioscoraceæ, 1 plate.—*Disepalum coronatum*, a new Bornean Anonacea, 1 plate. Ibid. ii.

J. Bell. The plants of the W. coast of Newfoundland. Canad. Naturalist, n. ser. iv.

A. Blytt. On the vegetation of Sogneflord in Norway, 8vo. Presented by the Royal University of Christiania.

O. Böckeler. The Cyperaceæ of the Royal Herbarium, Berlin. Linnæa, xxxvi.

M. H. Boquillon. Review of Verbenaceæ, 8vo, 20 plates. Presented by the Author.

M. Brauer. Enumeration of the plants collected on the Dnieper and the Lower Konka. Bull. Soc. Imp. Nat. Mosq. 1868, ii.

— de Brebisson. On the genus *Filago*. Bull. Soc. Linn. Norm. Ser. 2, ii.

A. Brongniart and A. Gris. On New-Caledonian Coniferæ. Bull. Soc. Bot. Fr. xvi.

R. Brown. The geographical distribution of Coniferæ and Gnetaceæ. Trans. Bot. Soc. Edinb. x.; and separate copy. Presented by the Author.

L. Buchenau. On the Alismaceæ, Junceæ, and allied orders collected by the brothers Schlagintweit in Upper Asia. Proc. (Nachrichten) R. Soc. Sc. Göttingen, 1869.

De Candolle. Prodromus, xvi. 1. Purchased.

T. Caruel. Conspectus of Italian Junci.—Of Italian Valerianeæ. —Note on *Veronica longistyla*. N. Giorn. Bot. Ital. i.

G. Casaretto. Notes on plants observed on the promontory of Portofino. N. Giorn. Bot. Ital. ii.

W. Colenso. On the Botany, geographic and economic, of the provinces of Nelson and Marlborough. Trans. N.-Zeal. Instit. i.

E. Cosson and Durieu de Maisonneuve. Exploration scientifique de l'Algérie, Botany, completion of vol. ii. Purchased.

F. Crépin. Prodromus of a monograph of Roses. Bull. Soc. R. Bot. Belg. viii.

R. O. Cunningham. Letter on the botany of the Straits of Magellan. Journ. Linn. Soc. Bot. xi.

F. Delpino. Monographic review of Marcgraviaceæ.—Short notes on the biological and genealogical relations of Marantaceæ. N. Giorn. Bot. Ital. i.

A. Dickson. On the development of the flower in *Pinguicula vulgaris*, and on the embryos of Lentibularieæ, 3 plates. Trans. R. Soc. Edinb. xxv.

A. T. Drummond. The introduced and spreading plants of Ontario and Quebec. Canad. Naturalist, New Ser. iv.

J. Duval-Jouve. On the priority of names of *Sporobolus pungens*. —On some French species of *Ægilops*. Bull. Soc. Bot. Fr. xvi.

A. Engler. Critical Index to the species and synonyms of *Saxifraga*. Trans. Zool. Bot. Soc. Vienna, xix.

T. B. Flower. Contributions towards a catalogue of the plants of Tenby. Presented by the Author.

T. Fourreau. Catalogue of the plants growing spontaneously along the course of the Rhone (concluded). Ann. Soc. Linn. Lyons, xvii.

E. Fries. Symbolæ ad synonymiam Hieraciorum. Proc. R. Acad. Sc. Stockh. xxiii.

P. Gennari. Florula of Caprera. N. Giorn. Bot. Ital. ii.

H. T. Hance. Fifth decade of Chinese plants.—Notes on *Quercus Wallichiana*, Lindl.—Four new Chinese Crassulaceæ. Seem. Journ. Bot. viii.

C. Hasskarl. On *Philydrum lanuginosum*, Br. Bull. Soc. Bot. Fr. xvi.

——. Commelinaceæ Indicæ, imprimis Archipelagi Indici. Presented by the Zoologico-Botanical Society of Vienna.

T. Hector. On the geographical Botany of New Zealand. Trans. N.-Zeal. Instit. i.

Hooker's Icones Plantarum, xi. part 3. Presented by the President.

— v. Jacobi. Addenda to his systematic arrangement of Agaves. Trans. Siles. Soc. Nat. Hist. 1868–69.

N. Kauffman. On the male flowers of *Casuarina quadrivalvis*, 1 plate. Bull. Soc. Imp. Nat. Mos. 1868, ii.

T. Kirk. Notes on plants observed during a visit to the north of Auckland.—On the botany of the Great Barrier island. Trans. N.-Zeal. Instit. i.

S. Kurz. Hypoxideæ Indicæ. Ann. Mus. Lugd. Bat. iv.

J. Lange. Review of the plants, either rare or new for the Danish Flora, collected in the years 1867 and 1868. Journ. Bot. Soc. Copenh. iii.

G. Lawson. The Canadian species of *Myosotis* and other Boragineæ;—of Ranunculaceæ. Canad. Naturalist, New Ser. iv.

W. Lauder-Lindsay. Notes on some plants from Otago, New Zealand. Seem. Journ. Bot. vii.

J. C. Lettsom. The Natural History of the Tea-tree, 4to, plates, 2nd edit. (1791). Presented by Mr. Hanbury.

P. Levy. On the Leaves of Nicaragua. Bull. Soc. Bot. Fr. xvi.

— Macoun. Plants new to Canada. Canad. Naturalist, New Ser. iv.

T. Meehan. Sexual law in *Acer dasycarpum*.—Variations in *Epigæa repens*.—Monœcism in *Luzula campestris*.—On the leaves of Coniferæ.—Dioicism of *Mitchella repens*.—Variations in *Taxodium* and *Pinus*.—On the seed-vessels of *Forsythia*. Proc. Acad. Nat. Sc. Philad. 1868.

J. Miers. Contributions to Botany, ii., 43 plates. Presented by the Author.

F. A. W. Miquel. Ecloge Rubiacearum Archipelagi Indici.—Enumeration of Violaceæ, chiefly from the Indian Archipelago.—On *Grammatophyllum Rumphianum*.—On Cinchonas cultivated in Java.—On some Urticeæ, 1 plate. Ann. Mus. Lugd. Bat. iv.

———. New Contributions to the knowledge of Cycadeæ, 2 plates.—On Japanese *Funckiæ*. Proc. R. Acad. Sc. Amsterd. Ser. 2, iii.; the latter paper also in Arch. Néerl. Sc. Exact. et Nat. iv.

Sir D. Monro. On the geographical Botany of the provinces of Nelson and Marlborough, compared with that of Canterbury. Trans. N.-Zeal. Instit. i.

C. Moore. Report on the vegetation of Lord Howe's Island. Presented by the Author.

F. Mueller. On *Acradenia*, Kipp. Proc. R. Soc. Tasmania, 1867.

A. Nielreich. Critical notes on the plants described in Schott's Analecta Botanica. Proc. Imp. Acad. Sc. Vienna, lviii.

———. Second supplement to the 'Flora of Lower Austria.' Trans. Zool. Bot. Soc. Vienna, xix.

F. v. Osten-Sacken and F. J. Ruprecht. Sertum Tianschanicum. Mem. Imp. Acad. Sc. Petersb. xiv.

C. A. J. A. Oudemans. On *Cycas inermis*, in reply to Miquel. Proc. R. Acad. Sc. Amsterd. Ser. 2, iii.

J. Paillot. Two new (critical) species of *Prunus*. Bull. Soc. Bot. Fr. xvi.

F. Parlatore. Flora Italiana, iv. part 2. Purchased.

G. A. Pasquale. Note on *Pachira glabra*;—on *Tetranthera caustricans*. N. Giorn. Bot. Ital. i.

V. Payot. On the vegetation of the snowy region of the Mont Blanc Mountains. Memb. Imp. Acad. Sc. Lyons, xvii.

R. A. Philippi. On a singular form of *Godetia Cavanillesii*, Spach. Bot. Zeit. 1870.

Pœppig and Endlicher. Nova Genera et Species Plantarum, folio, iii. Purchased.

E. Regel. Bromeliaceæ, from the botanical notes of the Garden of St. Petersburgh. Ann. Sc. Nat. Ser. 5, Bot. x.

J. A. Richter. On *Phragmites gigantea*. Bull. Soc. Bot. Fr. xvi.

P. Rohrbach. Synopsis of Lychnidæ. Linnæa, xxxvi.

——. On the structure of the flower in *Tropæolum*, 1 plate. Bot. Zeit. 1869.

F. Sandéen. On the origin and development of the embryo in Gramineæ, 2 plates. Trans. Univ. Lund, 1868.

W. W. Saunders. Refugium Botanicum, iii. parts 1, 2. Presented by the Author.

P. Savi. Note on *Bivonæa Saviana*, 1 plate. N. Giorn. Bot. Ital. i.

G. Schweinfurth. Sketches of the vegetation of Bahr-el-Gasal. Bot. Zeit. 1870.

A. Seemann. On *Godwinia gigas*, a new Aroidea from Nicaragua, 1 plate.—Two new species of *Vitis* from Central America.—A new *Oreopanax* from Nicaragua. Seem. Journ. Bot. vii.—*Phocea*, a new genus of Celastrineæ from New Caledonia.—Revision of Bignoniaceæ, continued. Ibid. viii.

T. P. Tournefort. Institutiones Rei Herbariæ, edit. 1700, 3 vols. 4to. Presented by Mr. Hanbury.

W. T. L. Travers. On the Flora of the provinces of Nelson and Marlborough, compared with that of Canterbury. Trans. N.-Zeal. Instit. i.

H. Trimen. On *Aira setacea*, Huds. Seem. Journ. Bot. vii.—*Callitriche truncata*, Guss., a British plant. Ibid. viii.

—— and W. T. Dyer. Flora of Middlesex, post 8vo. Presented by Mr. Hardwicke.

P. Van-Tieghem. Comparative Anatomy of the female flower and the fruit of Cycadeæ, Coniferæ, and Gnetaceæ, 4 plates. Ann. Sc. Nat. Ser. 5, Bot. x.

——. Anatomy of the female flower and fruit of the Walnut. Bull. Soc. Bot. Fr. xvi.

E. Warming. On the Uaranà, *Paullinia sorbilis*. Flora, 1869.

L. Warren. On Cheshire *Rubi*. Seem. Journ. Bot. vii.—On the *Dumetorum* group of British *Rubi*, 2 plates. Ibid. viii.

H. C. Watson. On the Thames-side *Brassica*. Seem. Journ. Bot. vii.

H. A. Weddell. Remarks on the generic name *Cascarilla*. Journ. Linn. Soc. Bot. xi.

E. Weiss. Contributions to the Flora of Greece and Crete. Trans. Zool. Soc. Vienna, xix.

F. Welwitsch. Sertum Angolense, 25 plates. Tr. Linn. Soc. xxvii.

A. Wesmael. On some Himalayan trees collected by Schlagintweit. Bull. Soc. R. Bot. Belg. viii.

A. Wood. Sketch of the Liliaceæ of Oregon and California. Proc. Acad. Nat. Sc. Philad. 1868.

——. On *Brevoortia*, 1 plate. Journ. Acad. Nat. Sc. Philad. vi.

M. Wretschko. On the development of the flower in Cruciferæ, 2 plates. Proc. Imp. Acad. Sc. Nat. Hist. lxviii.

— Zawadski. Enumeratio Plantarum Galiciæ et Bucovinæ, 1835. Purchased.

J. E. Zetterstedt. On the vegetation of the highland district of Småland. Trans. R. Acad. Sc. Stockh. New Ser. vi.

Physiological and Miscellaneous Botany:—

T. G. Agardh. On the Drift wood of Spitzberg, separate copy. Presented by the Author.

T. Anderson. On the cultivation of *Cinchona* in Bengal. Trans. Bot. Soc. Edinb. x.

G. Arcangeli. On some regular forms of vegetable cells. N. Giorn. Bot. Ital. i.

E. Askenasy. On the influence of the medium of growth on tho forms of plants, 2 plates. Bot. Zeit. 1870.

C. Bailey. On pollen considered as an aid in the differentiation of species. Monthl. Microsc. Journ. iii.

A. Batalin. On the fecundation of *Sagina nodosa*, *Mimulus guttatus*, and *Syringa vulgaris*. Bot. Zeit. 1870.

E. Borscow. On the reticulated parenchym-cells in the bark of *Ceropegia aphylla*, and their relation to the milky-juice vessels, 1 plate. Pringsh. Jahrb. vii.

— Boussaingault. On the functions of leaves. Ann. Sc. Nat. Ser 5, Bot. x.

T. Broughton. On a certain excretion of carbonic acid by living plants. Phil. Trans. R. Soc. clix.

A. de Candolle. Laws of Botanical Nomenclature, translated into Italian. N. Giorn. Bot. Ital. ii.

T. Caruel. On the gymnospermy of Coniferæ.—On the woolly

attachment of the seeds of *Luzula*.—Structure of leaves in *Passerina hirsuta*. N. Giorn. Bot. Ital. i.—On some matters observed in *Trapa natans*. Ibid. iii.

E. Cave. On the structure and development of the Fruit, 4 plates. Ann. Sc. Nat. Ser. 5, Bot. x.

H. Christ. On the origin of the Jura Flora. Bull. Soc. Bot. Fr. xvi.

H. Cleghorn. On the botany and agriculture of Malta and Sicily. Trans. Bot. Soc. Edinb. x.; also a separate copy. Presented by the Author.

K. Czeck. On the functions of stomata. Bot. Zeit. 1869.

T. Delpino. On the mutual influence of Plants and Animals in geographical distribution (from the Italian). Bot. Zeit. 1869.

——. On recently observed dichogamical arrangements. N. Giorn. Bot. Ital. ii.

P. Duchartre. An anomalous formation of internal adventive roots in *Œnanthe crocata*. Bull. Soc. Bot. Fr. xvi.

J. Duval-Jouve. On some tissues in *Juncus* and in Gramineæ, 1 plate. Bull. Soc. Bot. Fr. xvi.

— Germain de St. Pierre. On the dehiscence of Fruits.—On the distinction of rhizomes and roots. Bull. Soc. Bot. Fr. xvi.

— v. Gorkom. Report on Cinchona-culture for the third quarter of 1869. Flora, 1869.

A. Guillard. Note on the anatomical significance of the terms stem and root. Bull. Soc. Bot. Fr. xvi.

J. Hanstein. On the first development of the axial and foliary organs in phanerogamic plants.—On the growth of the roots of Phanerogams. Bot. Zeit. 1870.

C. Hasskarl. On Cinchona-cultivation in Java. Flora, 1869.

F. Hildebrand. On the floating leaves of *Marsilea*, and some other amphibious plants, 1 plate. Bot. Zeit. 1870.

T. v. Horen. Observations on the physiology of Lemnaceæ, 1 plate. Bull. R. Soc. Bot. Belg. viii.

E. Jardin. On the Surtabrandur of Iceland, its ancient forests, and the re-wooding of the island. Bull. Soc. Linn. Norm. Ser. 2, ii.

G. King. Notes on the famine food of Marwar. Trans. Bot. Soc. Edinb. x.

S. Kurz. Report on the vegetation of the Andaman Islands, map. Presented by the Author.

S. O. Lindberg. Observations in botanical morphology (*Aconitum*, *Monotropa*, *Trifolium*, *Oxalis*). Proc. R. Acad. Sc. Stockh. xxii.

C. Linsser. Researches on the periodical phenomena of life in plants. Mem. Imp. Acad. Sc. Petersb. xiii.

T. Meehan. On the sexual law in Coniferæ. Proc. Acad. Nat. Sc. Philad. 1869.

C. B. Moens. Chemical researches on the bark of *Cinchona Calisaya*. Flora, 1869.

H. v. Mohl. A biological peculiarity of some species of *Cuscuta*. Bot. Zeit. 1870.

Fritz Müller. On the conversion of anthers into stigmas in *Begonia*, and other morphological notes. Bot. Zeit. 1870.

W. Ogle. On the fertilization of various plants by insects, 2 papers, 2 plates. Pop. Sc. Review, ix.

E. Pfitzer. Observations on graft-hybrids. Bot. Zeit. 1869.

E. Prillieux. On the influence of the intensity of coloured light on the quantity of gas disengaged by submerged plants. Ann. Sc. Nat. Ser. 5. Bot. x.

——. On the viridescence of etiolated plants. Bull. Soc. Bot. Fr. xvi.

N. W. P. Rauwenhoff. Phyto-physiological observations, 1 plate. Proc. R. Acad. Sc. Amsterd. Ser. 2, iii.

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T. Schlœsing. Comparative vegetation of Tobacco under a bell-glass and in the open air. Ann. Sc. Nat. Ser. 5, Bot. x.

T. Schrœder. On the period of vernation of *Acer platanoides*, 8 plates. Pringsh. Jahrb. vii.

N. Speschneff. On the downward curvature of roots. Bot. Zeit. 1870.

C. K. Sprengel. On the fertilization of flowers by Insects (Das entdeckte Geheimniss der Natur), 4to. 1793. Purchased.

J. L. Stewart. Notes of a botanical tour in Laddak or western Tibet. Trans. Bot. Soc. Edinb. x.

J. Tchistiakoff. On the development of the cuticle, its relation to the development of organs, and some of its physical properties, 2 plates (in Russian, with an abstract in German). Bull. Soc. Imp. Nat. Mosc. 1868, ii.

W. T. L. Travers. On hybridization with reference to variations in plants. Trans. N.-Zeal. Instit. i.

F. Unger. Further researches on the motion of sap in plants, 1 plate and woodcuts. Proc. Imp. Acad. Sc. Vienna, lviii.

A. Vogl. Contributions to the Anatomy of Plants (chiefly Cinchona-bark), 1 plate. Trans. Zool. Bot. Soc. Vienna, xix.

W. Woolls. Lecture on the progress of Botanical discovery in Australia. Presented by the Author.

CRYPTOGAMIC BOTANY:—

J. G. Agardh. On Laminarieæ (from Trans. Univers. Lund).—On the Laminarieæ of Spitzberg (from Trans. R. Acad. Sc. Stockh.), separate copies. Presented by the author.

F. Ardissone. Studies of Italian Algæ, 6 plates. N. Giorn. Bot. Ital. i.

T. Arnold. The Lichens of Frankish Jura. Flora, 1869.—Lichenological Fragments. Flora, 1870.—Lichenological Excursions in Tyrol. Trans. Zool. Bot. Soc. Vienna, xix.

E. Askenasy. On *Ectocarpus*, 1 plate. Bot. Zeit. 1869.

F. Baglietto. Note on *Endocarpon Guepini*, Delise, woodcuts. N. Giorn. Bot. Ital. ii.

O. G. Blomberg. On the Lichen vegetation of Kinnehulle, with one new species. Proc. R. Acad. Sc. Stockh. xxiv.

M. H. Bocquillon. Anatomy and physiology of the reproductive organs of Fungi and Lichens, 4to, 2 plates. Presented by the author.

E. Borscow. On the discharge of Ammonia by Fungi. Bull. Imp. Acad. Sc. Petersb. xiv.

E. Boudier. On the Ascoboli, 8 plates. Ann. Sc. Nat. Ser. 5, Bot. x.

R. Braithwaite. On the geographical distribution of Mosses (after Dr. Schimper). Journ. Queck. Microsc. Club, ii.

J. S. D. Branth and E. Rostrup. Lichenes Daniæ. Journ. Bot. Soc. Copenh. iii.

A. Braun. On a new *Isoëtes* from New Zealand. Proc. R. Acad. Sc. Berlin, 1869.

A. Braun and C. Bouché. Reformed nomenclature of *Selaginellæ* now cultivated, or which have been cultivated in gardens. Ann. Sc. Nat. Ser. 5, Bot. x.

A. de Brébisson. Notes on French Diatomaceæ. Journ. Queck. Microsc. Club, ii.

O. Brefeld. *Dictyostelium mucoroides*, a new organism related to Hymenomycetes, 3 plates. Trans. Senkenb. Soc. Nat. Frankf. vii.

O. Brefeld. History of the development of *Empusa muscæ* and *E. radicans*. Bot. Zeit. 1870.

L. Caldesi. *Lenzites faventina*, Cald. N. Giorn. Bot. Ital. i.

B. Carrington. Two new British Hepaticæ. Seem. Journ. Bot. viii.

H. J. Carter. On the development of *Sorastrum spinulosum*, Näg., and description of a new *Protococcus*, 1 plate. Ann. Nat. Hist. Ser. 4, iv.

P. T. Cleve. Diatomaceæ from Spitzberg, 2 plates. Proc. R. Acad. Sc. Stockh. xxiv.—Swedish and Norwegian Diatomaceæ. Ibid. xxv.

A. Coigneaux. Analytical tables of Belgian pleurocarpic Mosses, without the aid of the organs of fructification. Bull. R. Bot. Soc. Belg. viii.

M. C. Cooke. On microscopic Moulds, 2 plates. Journ. Quek. Microsc. Club, ii.

J. M. Crombie. Lichenes Britannici, 1 vol. Presented by the Author.

— Dickie. On *Grimmia contorta* new to Britain.—On Diatomaceæ from Danish Greenland.—On the range in depth of Marine Algæ. Trans. Bot. Soc. Edinb. x.

P. Duchartre. Observations on the turning of Fungi (from the Comptes Rendus). Ann. Nat. Hist. Ser. 4, v.

A. M. Edwards. Notes on Diatomaceæ. Monthl. Microsc. Journ. iii.

J. H. L. Flögel. On optical appearances in Diatomaceæ. Bot. Zeit. 1869.

E. Fournier. On Mexican Ferns.—Two new species of *Pellæa*. —On New-Caledonian Ferns. Bull. Soc. Bot. Fr. xvi.

J. M. Fries. The Lichens of Spitzberg. Trans. R. Acad. Sc. Stockh. vii.

E. Fries. The Edible and Poisonous Fungi of Sweden, parts 7 to 10, plates 54 to 93. Presented by the Royal Academy of Sciences of Sweden.

L. Fuchs. The fructification of *Rhizomorpha*. Bot. Zeit. 1870.

V. Graber. On the proventriculus and ventricular appendages in Grasshoppers and Locusts, 3 plates. Proc. Imp. Acad. Sc. Vienna, lix.

E. Hampe. Critical notes on the Mosses of Planchon and Triana's Synopsis Floræ Novæ Granadæ. Bot. Zeit. 1869.—Mosses of Natal, collected by the Rev. Borgen.—New Mosses from Mexico, in Sonder's Herbarium. Ibid. 1870.

——. New Mexican Mosses. Trans. Zool. Bot. Soc. Vienna, xix.

f 2

P. J. Hellbom. Lichenological observations made in a tour in Lapland in 1864. Proc. R. Acad. Sc. Stockh. xxii.—Lichenological observations made in Nerike in 1866. Ibid. xxiii.—The rarer species of Lichens found in Nericia. Ibid. xxiv.

F. Hildebrand. On Marsilea. Flora, 1870.

G. Inzenga. Second century of new Sicilian Fungi, 2 plates. Giorn. Istit. Tecn. Palermo, v.

H. Karsten. On *Exobasidium*, Woron. Ann. Nat. Hist. Ser. 4, iv.

C. Knight. Notes on the Stictei of the Kew Museum. Journ. Linn. Soc. Bot. xi.

L. Kny. On the structure and development of antheridia in Ferns (from Proc. R. Acad. Sc. Berlin), 1 plate. Ann. Nat. Hist. Ser. 4, v.

A. v. Krempelhuber. History and literature of Lichenology to the close of 1865, vol. ii. Purchased.

——. On the Lichen Flora of Spain. Flora, 1869.

M. Kuhn. Filices of the Indian Archipelago. Ann. Mus. Lugd. Bat. iv.

——. The Ferns of the New Hebrides. Trans. Zool. Bot. Soc. Vienna, xix.

W. Lauder-Lindsay. Observations on new Lichenicolous Microfungi, 2 plates. Trans. R. Soc. Edinb. xxv.

——. The Lichen Flora of Greenland.—On colour-reaction as a specific character in Lichens. Trans. Bot. Soc. Edinb. x.

W. A. Leighton. Notulæ Lichenologicæ (continued). Ann. Nat. Hist. Ser. 4, v.

H. Leitgeb. Development of the antheridia in *Fontinalis antipyretica*, 3 plates. Proc. Imp. Acad. Sc. Vienna, lviii.

——. New Saprolegnieæ. Pringsh. Jahrb. vii.

S. A. Lindberg. Enumeration of the Mosses collected in the Spitzberg expeditions of 1858 and 1861. Proc. R. Acad. Sc. Stockh. xxiii.

H. Lojka. Report on a Lichenological tour in North Hungary. Trans. Zool. Bot. Soc. Vienna, xix.

R. L. Maddox. On the cultivation &c. of microscopic Fungi. Monthl. Microsc. Journ. iii.

P. Magnus. On the morphology of *Naias*. Bot. Zeit. 1869.

G. v. Martens. Third list of Bengalese Algæ. Proc. Asiat. Soc. Bengal, 1870.

G. Mettenius. Ferns of the Indian Archipelago. Ann. Mus. Lugd. Bat. iv.

J. Milde. Two new Mosses. Bot. Zeit. 1869.—On *Metzleria alpina*.- On erratic Mosses. Ibid. 1870.

J. Milde. Monograph of *Botrychia*, 3 plates. Trans. Zool. Bot. Soc. Vienna, xix.

A. Millardet. On the male prothallium of vascular Cryptogams. Ann. Nat. Hist. Ser. 4, v.

C. Müller. *Splachnobryum*, a new genus of Splachnaceæ. Trans. Zool. Bot. Soc. Vienna, xix.

G. de Notaris. Synopsis (Epilogo) of Italian Bryology. Trans. R. Univ. Genoa, i.

W. Nylander. On reactions in Cetrarieæ and in *Alectoria*. Bot. Zeit. 1869.

——. Synopsis of the Lichens of New Caledonia.—Synoptical conspectus of Stictineæ.—The Angola Lichens of Dr. Welwitsch. Bull. Soc. Linn. Norm. Ser. 2, ii.

L. Piré. Review of the Belgian acrocarpic Mosses. Bull. R. Soc. Bot. Belg. viii.

N. Pringsheim. On the pairing of zoospores in *Pandorina* and *Eudorina*, 1 plate. Proc. R. Acad. Sc. Berlin, 1869, translated into Ann. Nat. Hist. Ser. 4, v.

G. Rivet. On the influence of a plantation of Barberries on the production of Rust in Cerealia. Bull. Soc. Bot. Fr. xvi.

S. Rosanoff. Observations on the functions and properties of the pigments of different Algæ. Mem. Soc. Imp. Sc. Nat. Cherbourg, xiii.

P. Savi. Researches on the fecundation of *Salvinia natans*, with observations by E. Marcucci, 2 plates. N. Giorn. Bot. Ital. i.

W. P. Schimper. Synonymy of the Mosses of the Linnean Herbarium. Journ. Linn. Soc. Bot. xi.

——. Synopsis Muscorum Europæorum, 8vo. Purchased.

Dr. Schröter. On *Synchytria*. Flora, 1870, and Bot. Zeit. 1870.

S. Schulzer v. Müggenburg. Remarks on the polymorphism of some Fungi. Trans. Zool. Bot. Soc. Vienna, xix.

J. Schumann. Contribution to the natural history of Diatoms. Trans. Zool. Bot. Soc. Vienna, xix.

W. G. Smith. *Peziza macrocalyx*, Riess., a new British Fungus, 2 plates. Seem. Journ. Bot. vii.—Clavis Agaricorum, 6 plates. Ibid. viii.

C. Stenhammer. Synonymy and history of parts 7 and 8 of the Lichenes Suecici exsiccati. Proc. R. Acad. Sc. Stockh. xxii.

J. Stenhouse. Chemical notes on certain Lichens. Proc. R. Soc. xviii.

E. Stitzenberger. Analytical key to Lecideæ (from the N. Act. Acad. Nat. Cur.). Ann. Nat. Hist. Ser. 4, v.

E. Strasburger. On the mechanism of fertilization in acrogenous Cryptogams. Ann. Sc. Nat. Ser. 5, Bot. x. Pringsh. Jahrb. vii. Ann. Nat. Hist. Ser. 4, v.

——. The sexual organs and fertilization in *Marchantia polymorpha*. Pringsh. Jahrb. vii.

A. Trécul. On the position of the Tracheæ in ferns. Ann. Sc. Nat. Ser. 5, Bot. x.

V. Trevesan. On the genus *Dimelæna*, Norm. N. Giorn. Bot. Ital. i.

G. Venturi. Bryological florula of the valley of Rabbi in the Trentino, with 2 new species. N. Giorn. Bot. Ital. ii.

C. S. Wake. The development of organisms in organic infusions. Monthl. Microsc. Journ. ii.

— Zanardini. Iconographia Phycologica Mediterraneo-Adriatica, ii. part 5. Purchased.

J. E. Zetterstedt. Some Mosses from New Holland. Proc. R. Acad. Sc. Stockh. xxiv.

——. The Moss vegetation of the Pyrenees in the neighbourhood of Luchon. Trans. R. Acad. Sc. Stockh. v.

PALÆONTOLOGY:—

W. H. Baily. Figures of characteristic British Fossils, part 2, 10 plates. Presented by the Author.

E. Billings. On the structure of Crinoidea, Cystidea, and Blastoidea, woodcuts. Canad. Naturalist, N. Ser. iv. and in Ann. Nat. Hist. Ser. 4, v.

J. Bosquet. Two new species of *Mathildea* from the Tertiary formation, 1 plate. Proc. R. Acad. Sc. Amsterd. Ser. 2, iii., and Arch. Néerl. Sc. Exact. et Nat. iv.

J. F. Brandt. On the genus *Dinotherium*. Mem. Imp. Acad. Sc. Petersb. xiv.

G. Busk. On the discovery at Sarawak, in Borneo, of the fossilized teeth of a Rhinoceros and of a cervine Ruminant. Proc. Zool. Soc. 1869.

W. B. Carpenter. On the shell-structure of *Fusulina*, ½ plate. Monthl. Microsc. Journ. iii.

—— and H. Brady. Description of *Parkeria* and *Loftusia*, two gigantic types of arenaceous Foraminifera, 9 plates. Phil. Trans. R. Soc. clix.

W. Carruthers. On the structure of the stems of the arborescent Lycopodiaceæ of the Coal-measures, 1 plate. On the genera *Ulodendron*, *Bothrodendron*, and *Megaphytum*, 2 plates and woodcuts. Monthl. Microsc. Journ. ii. iii.

W. Carruthers. On fossil Cycadean stems from the Secondary rocks of Britain, 10 plates. Trans. Linn. Soc. xxvi.

E. Coemans. Note on Equisetaceæ. Seem. Journ. Bot. vii.

E. D. Cope. On a large Enaliosaurian from Kansas.—On some remains of extinct Cetacea.—Second contribution to the history of the Vertebrata of the miocene period of the United States.—Synopsis of the extinct Batrachia of North America.—On some cretaceous Reptilia. Proc. Acad. Nat. Sc. Philad. 1868.—Third contribution to the fauna of the miocene period of the United States. —Review of the species of Plethodontidæ and Desmognathidæ. Ibid. 1869.

G. Cotteau. On the genus *Asterostoma* belonging to the family Echinocorydeæ. Ann. Nat. Hist. Ser. 4, v.

E. Deslongchamps. Various papers on Teleosaurians and other palæontological subjects, 9 plates. Bull. Soc. Linn. Normandy, Ser. 2, i.

M. Duncan and H. M. Jenkins. On *Palæocoryne*, a genus of tubularine Hydrozoa from the carboniferous formation, 1 plate. Phil. Trans. R. Soc. clix.

E. v. Eichwald. The *Lethæa rossica* and its opponents. Bull. Soc. Imp. Nat. Mosc. 1868, ii.

F. Fuchs. On the Shell-fauna of the Vicentine Tertiary formation. Proc. Imp. Acad. Sc. Vienna, lviii.—Eocene Shells from the Government of Kherson in Russia. Ibid. lix.

G. G. Gemmellaro. Palæontological studies of the *Terebratula-janitor*-calcareous formations of Northern Sicily, 1 plate. Giorn. Istit. Tecn. Palermo, v.

E. Hæckel. On fossil Medusæ of the Jura period, 3 plates. Zeitschr. wiss. Zool. xix.

A. Hancock and T. Atthey. On an undescribed fossil Fish from the Newsham Coal-shale. Ann. Nat. Hist. Ser. 4, v.

—— ——. On the occurrence of *Loxomma Allmanni* in the Northumberland coal-field. Ann. Nat. Hist. Ser. 4, v.

A. Hancock and R. Howse. On *Janassa bituminosa*, Schloth., from the Marl-slate of Midderidge, 2 plates. Ann. Nat. Hist. Ser. 4, v.

O. Heer. On the fossil plants discovered in Spitzberg by A. D. Nordenskiold and C. W. Blomstrand. Proc. R. Acad. Sc. Stockh. xxiii.—Letter on the fossil plants of South America collected by H. Furuhjelm. Ibid. xxv.

——. Contributions to the Chalk flora, 11 plates. Mem. Helv. Soc. Nat. Sc. Zurich, xxiii.

O. Heer. Fossil plants collected by E. Whymper in North Greenland in 1867, 18 plates. Phil. Trans. R. Soc. clix.

T. R. Jones, W. K. Parker, and J. W. Kirkby. On the nomenclature of the Foraminifera, 1 plate. Ann. Nat. Hist. Ser. 4, iv.

J. G. H. Kinberg. On the skeleton of a Fox found at 10 to 15 feet depth at Marieberg, near Addevalla. Proc. R. Acad. Sc. Stockh. xxv.

T. Karrer. The miocene Foraminifera-fauna of Kosteg in the Banat, 5 plates. Proc. Imp. Acad. Sc. Vienna, lviii.

G. C. Laube. On *Ammonites Aon*, Münst., and its allies.—On some fossil Echinidæ from the Murray cliffs in South Australia, 1 plate. Proc. Imp. Acad. Sc. Vienna, lix.

J. Lea. Descriptions of Unionidæ from the lower Cretaceous formations of New Jersey. Proc. Acad. Nat. Sc. Philad. 1868.

J. Leidy. The extinct Mammalian Fauna of Dacota and Nebraska, with a synopsis of the Mammalian remains of North America, 30 plates. Journ. Acad. Nat. Sc. Philad. vii.—Numerous Palæontological papers. Proc. Acad. Nat. Sc. Philad. 1868 and 1869.

G. Lindström. Observations on *Zoantharia rugosa*, 2 plates. Proc. R. Acad. Sc. Stockh. xxii.—On two new Upper-Silurian Corals from Gothland, 1 plate. Ibid. xxv.

J. G. O. Linnarson. On some fossils found in the Eophyton sandstone of Lugnäs in Sweden, 3 plates. Presented by the Author.

P. de Loriol and V. Gilliéron. Palæontological and stratigraphical monograph of the Lower Urgonian stage of Langeron, 8 plates. Mem. Helv. Soc. Nat. Sc. Zurich, xxiii.

J. Lycett. On a byssiferous fossil *Trigonia*. Ann. Nat. Hist. Ser. 4, v.

A. Manzoni. On the pliocene Bryozoa of Italy, 2 plates. Proc. Imp. Acad. Sc. Vienna, lix.

Abbé Marc. On *Elephas primigenius*. Bull. Soc. Linn. Normandy, Ser. 2, i.

J. B. Meek and A. H. Worthen. On the structure and habits of palæozoic Crinoidea.—On some types of carboniferous Crinoidea and one Echinoidea. Proc. Acad. Nat. Sc. Philad. 1868.—Descriptions of new Crinoidea and Echinoidea from the carboniferous rocks of the Western States.—Remarks on Blastoidea, and descriptions of new species.—Descriptions of new carboniferous Fossils from the Western States. Ibid. 1869.

——. On palæozoic Crinoidea. Canad. Naturalist, N. Ser. iv.

A. Milne-Edwards and A. Grandidier. On *Æpyornis* (from the Comptes Rendus). Ann. Nat. Hist. Ser. 4, iv.

H. A. Nicholson. On the British species of *Didymograpsus*, 1 plate. Ann. Nat. Hist. Ser. 4, v.

G. W. Ormerod. On the *Hippopotamus majôr* said to have been found in Kent's Cavern. Trans. Devon. Assoc. Sc. Lit. and Art, iii.

R. Owen. Human and Equine remains from the cavern of Bruniquel, 4 plates.—Fossil remains of Equines from Central and South America, 2 plates. Phil. Trans. R. Soc. clix.

V. Payot. Palæontology of the neighbourhood of Mont Blanc. Ann. Sc. Phys. Soc. Imp. Agr. Lyons, Ser. 3. viii.

W. Pengelly. On the submerged forest at Blackpool, near Dartmouth.—On the alleged occurrence of *Hippopotamus major* and *Machærodus latidens* in Kent's Cavern. Trans. Dev. Assoc. Sc. Lit. and Art, iii.

A. E. Reuss. Palæontological studies on the older tertiary strata of the Alps (10 plates, not yet issued). Proc. Imp. Acad. Sc. Vienna, lviii.

— Schlumberger. Palæontological notes, 1 plate. Bull. Soc. Linn. Normandy, Ser. 2, 1.

H. G. Seeley. On *Ornithopsis*.—On *Zoocapsa dolichorhamphia*. Ann. Nat. Hist. Ser. 4, v.

R. Tate. Contributions to Jurassic palæontology. Ann. Nat. Hist. Ser. 4, iv.

W. C. Williamson. Contributions to the History of *Zamia Gigas*, 2 plates. Trans. Linn. Soc. xxvi.

T. C. Wintler. Two new fossil Tortoises. Archiv Néerl. Sc. Exact. et Nat. iv.

Palæontographical Society, vol. xxiii. for 1869. Purchased.

Miscellaneous:—

L. Agassiz. Address delivered on the centenary anniversary of the birth of Alex. v. Humboldt. Presented by the Author.

W. Braubach. Religion, Moral, and Philosophy of the Darwinian doctrine of species. Presented by Mr. Darwin.

J. Collins. On India Rubber (from Journ. Soc. Arts). Separate copy presented by the Author.

E. D. Cope. On the origin of Genera. Proc. Acad. Nat. Sc. Philad. 1868.

J. M. Crombie. The geological relations of the Alpine Flora of Great Britain. Proc. R. Soc. xviii.

J. M. Dempsey. Our Ocean Highways. Presented by the Author.

A. Ernst. Amadeo Bonpland, a Biography read at the Society of Physical and Natural Sciences of Caraccas. Presented by the Author.

D. Hanbury. Historical notes on Manna (from the Pharmaceutical Journal). Presented by the Author.

K. B. Heller. Darwin and Darwinism. Presented by Mr. Darwin.

J. Hogg. Results of Spectral Analysis (from the Monthly Microscopical Journal). Presented by the Author.

G. Jæger. The Darwinian Theory. Presented by Mr. Darwin.

——. On Spontaneous Generation and Fertilization. Zeitschr. wiss. Zool. xix.

L. Jenyns. Address of the President at the opening meeting of the Bath Natural-History and Antiquarian Field-Club. Presented by the Author.

M. Johnson. Jottings by a student of Heterogeny. Monthl. Microsc. Journ. iii.

E. Lartet and H. Christy. Reliquiæ Aquitanicæ, part 10. Presented by the executors of the late H. Christy.

J. Lea. Notes on microscopical Crystals included in some Minerals. Presented by the Author.

E. J. Lowe. Natural Phenomena and Chronology of the Seasons. Presented by the Author.

E. Parfitt. On Spontaneous Generation. Trans. Devon. Assoc. Sc. Lit. and Art, iii.

H. v. Post. Observations on Animal and Vegetable Statistics. Proc. R. Acad. Sc. Stockh. xxiv.

A. Quadri. Notes on the Darwinian Theory. Presented by Mr. Darwin.

H. Schacht. The Microscope, edited by F. Currey. Presented by the Editor.

C. J. Sundevall. The Animals of Aristotle: Mammals, Birds, Reptiles, and Insects (in German, from the Swedish). Presented by the Author, with additions.

G. Tate. The Geology, Botany, and Zoology of the neighbourhood of Alnwick, map and 2 plates. Presented by the Author.

May 24th, 1870.

Anniversary Meeting.

George Bentham, Esq., President, in the Chair.

This day, the Anniversary of the birth of Linnæus, and the day appointed by the Charter for the Election of Council and Officers, the President opened the buisness of the Meeting with the following Address:—

GENTLEMEN,

THE Reports which have been read to you on the finances and statistics of the Society may not be quite so favourable as usual. The number of Fellows whose loss we have to deplore is about the average; but the new ones elected have been below the numbers of the last two or three years. There has also been a considerable diminution in our receipts; but the falling off has been chiefly in compositions, a larger number of our newly elected Fellows having preferred annual payments. This reduces for the moment the Society's income, although in the long run compositions are much more favourable to the Fellows themselves than to the Society. Some delay has taken place in the issue of our publications, owing chiefly to difficulties with the authors of some papers as to the correction of the press. There is a general anxiety to commence printing before the whole of a paper is written, which it is calculated may be done whilst the first sheets are going through the press, and without a final revision even of those sheets, which is reserved for the proof; the result has been that some papers have been almost rewritten at that stage, causing great delays and considerable expense, besides that the stoppage of any one paper once in the printer's hands stays the progress of all subsequent ones. The Council have therefore, on the report of a Committee specially charged to inquire into the printing-arrangements, adopted regulations by which they hope to obviate future delays, the main features of which are, that no paper shall be forwarded to the printers until the whole of it is complete, and that, while full provision is made for the due correction of errors, alterations of the text are discountenanced, and if they occasion an extra expenditure beyond the liberal allowance of 15*s*. per sheet, the excess shall be at the charge of the respective authors. Notwithstanding, however, the above-mentioned delays, we have now, since the commencement of the year, besides the usual Journals, issued two parts of the Transactions, one illustrated by twenty-five plates, the expense of which was, in great measure, defrayed by the liberality of the distinguished author of the paper it contained, Dr. Welwitsch; and for the other we have equally to convey our thanks to Mr. Carruthers for the ten plates illustrating his own paper. A third part is now complete, and will be ready for delivery in the course of a day or two, and two or three very important botanical papers are in hand for the next issue. We have also been able to devote the usual sums towards the maintenance and increase of our Library.

It had been my intention on the present occasion to carry on the sketches of the general progress of biological science which I had attempted in 1862, 1864, 1866, and 1868; but I have, from various causes, been unable to devote so much time as usual to the preparation of my Address, and feel obliged to confine myself to a few points connected with subjects of special interest to myself, which, within the last two or three years, have made considerable advances.

The most striking are, without doubt, the results obtained from the recent explorations of the deep-sea faunas, and from the investigation of the tertiary deposits of the arctic regions, which, although affecting two very different branches of natural science, I here couple together, as tending, both of them, to elucidate in a remarkable degree one of the most important among the disputed questions in biological history, the continuity of life through successive geological periods.

An excellent general sketch of the first discovery and progressive investigation of animal life at the bottom of the sea at great depths, up to the close of the season of 1868, is given by Dr. Carpenter in the Proceedings of the Royal Society, vol. xvii. n. 107, for Dec. 17, 1868. The results of the still more important expedition of the past year have as yet been only generally stated by Mr. Gwyn Jeffreys, in the numbers of 'Nature' for Dec. 2 and 9, 1869, and by Dr. Carpenter, in a lecture to the Royal Institution, published in the numbers of 'Scientific Opinion' for March 23 and 30 and April 6 and 13 of the present year; and further details, as to the Madreporaria, are given by Dr. Duncan in the Proceedings of the Royal Society, vol. xviii. no. 118, for March 24 of the present year; whilst, in North America, the chief conclusions to be drawn from these researches into the deep-sea fauna are clearly and concisely enumerated by Prof. Verrill, in the number of Silliman's Journal for January last; and some of the more detailed reports of the American explorations, by Louis and Alexander Agassiz and others, have been published in the Bulletin of the Museum of Comparative Zoology at Harvard College, nos. 6, 7, and 9 to 13. For the knowledge of the data furnished by the tertiary deposits of the arctic regions we are indebted almost exclusively to the acute observations and able elucidations of Prof. O. Heer, in his 'Flora Fossilis Arctica,' in his paper on the fossil plants collected by Mr. Whymper in North Greenland, published in the last part of the Philosophical Transactions for 1869, and in the as yet only short general sketch of the results of the Swedish Spitzbergen Expeditions, contained in the Genevese 'Bibliothèque Universelle, Archives Scientifiques,' for Dec. 1869.

It would be useless for me here to retrace, after Dr. Carpenter and Prof. Verrill, the outlines of the revolution which these marine discoveries have caused in the previously conceived theories, both as to the geographical distribution of marine animals, and the relative influences upon it of temperature and depth, and as to the actual temperature of the deep seas, or to enter into any details of the enormous additions thus made to our knowledge of the diversities of organic life; and it would be still further from my province to consider the geological conclusions to be drawn from them. My object is more especially to point out how these respective dips into the early history of marine animals and of terrestrial forests have afforded the strongest evidence we have yet obtained, that apparently unlimited permanency and total change can go on side by side, without requiring for the latter any general catastrophe that should preclude the former.

There was a time, as we learn, when our chalk-cliffs, now high and dry, were being formed at the bottom of the sea by the gradual growth and decay of Globigerinæ and the animals that fed on them —amongst others, for instance, *Rhizocrinus*, and *Terebratulina caput-serpentis*; and when, at a later period, the upheaval of the ground into an element where these animals could no longer live arrested their progress in that direction, they had already spread over an area sufficiently extensive for some part of their race to maintain itself undisturbed; and so, on from that time to the present day, by gradual dispersion or migration, in one direction or another, the same *Rhizocrinus* and *Terebratulina* have always been in possession of some genial locality, where they have continued from generation to generation, and still continue, with Globigerinæ and other animals, forming chalk at the bottom of the sea, unchanged in structural character, and rigidly conservative in habits and mode of life through the vast geological periods they have witnessed. So also there was a time when the hill-sides of Greenland and Spitzbergen, now enveloped in never-melting ice and snows, were, under a genial climate, clothed with forests, in which flourished *Taxodium distichum* (with *Sequoiæ*, *Magnoliæ*, and many others); and when at a later period these forests were destroyed by the general refrigeration, the Taxodium already occupied an area extensive enough to include some districts in which it could still live and propagate; and whatever vicissitudes it may have met with in some parts, or even in the whole, of its original area, it has, by gradual extension and migration, always found some spot where it has gone on and thriven, and continued its race from generation to generation down to the present day,

unchanged in character, and unmodified in its requirements. In both cases, the permanent animals of the deep-sea bottom and the permanent trees of the terrestrial forests have witnessed a more or less partial or complete change in the races amongst which they were commingled. Some of these primitive associates, not endowed with the same means of dispersion, and confined to their original areas, were extinguished by the geological or climatological changes, and replaced by other races amongst which the permanent ones had penetrated, or by new immigrants from other areas; others, again, had spread like the permanent ones, but were less fitted for the new conditions in which they had become placed, and in the course of successive generations have been gradually modified by the Darwinian process of natural selection, the survival of the fittest only among their descendants. If, in after times, the upheaved sea-bottom becomes again submerged, the frozen land becomes again suited for vegetation, they are again respectively covered with marine animals or vegetable life, derived from more or less adjacent regions, and more or less different from that which they originally supported, in proportion to the lapse of time and extent of physical changes which had intervened. Thus it is that we can perfectly agree with Dr. Duncan, that "this persistence (of type and species through ages, whilst their surroundings were changed over and over again) does not indicate that there have not been sufficient physical and biological changes during its lasting to alter the face of all things enough to give geologists the right of asserting the succession of several periods;" but we can, at the same time, feel that Dr. Carpenter is in one sense justified in the proposition, that we may be said to be still living in the Cretaceous period. The chalk formation has been going on over some part of the North Atlantic sea-bed, from its first commencement to the present day, in unbroken continuity and unchanged in character.

If once we admit as demonstrated the coexistence of indefinite permanency and of gradual or rapid change in different races in the same area, and under the same physical conditions, according to their constitutional idiosyncracies, and also that one and the same race may be permanent or more or less changing, according to local, climatological, or other physical conditions in which it may be placed, we have removed one of the great obstacles to the investigation of the history of races, the apparent want of uniformity in the laws which regulate the succession of forms. We may not only trace, with more confidence, such modifications of race through successive geological periods as Prof. Huxley has recently

exhibited to us in respect of the Horse, but we can understand more readily the absolute identity of certain species of plants inhabiting widely dissevered areas, of which the great majority of species are more or less different. One of the arguments brought forward against the community of origin of representative species in distant regions, such as temperate Europe and the Australian Alps, the Arctic Circle and Antartic America, the Eastern United States and Japan respectively—an argument which long appeared to me to have considerable weight—was this:—if disseverance and subsequent isolation result necessarily in a gradual modification by natural selection, how is it that when all are subjected to the same influences, the descendants of some races have become almost generically distinct in the two regions, whilst others are universally acknowledged as congeners, but specifically distinct, and others again are only slight varieties or have remained absolutely identical? To this we can now reply, with some confidence, that there is no more absolute uniformity in the results of natural selection than in any other of the phenomena of life. External influences act differently upon different constitutions. Were we to remove the whole flora and fauna of a country to a distant region, or, what comes to the same thing, change the external conditions of that flora and fauna, as to climate, physical influences, natural enemies, or other causes of destruction, means of protection, &c., we should now be taught to expect that some of the individual races would at once perish; others, more or less affected, might continue through several generations, but with decreasing vigour, and, in the course of years or ages, gradually die out, to be replaced by more vigorous neighbours or invaders. Others, again, might see amongst their numerous and ever varying offspring some few slightly modified, so as to be better suited for the new order of things; and experience has repeatedly shown that the change once begun may go on increasing through successive generations and a permanent representative species may be formed. And some few races might find themselves quite as happy and vigorous under their new circumstances as under the old, and might go on as before, unchanged and unchanging.

Taking into consideration the new lights that have been thrown upon these subjects by the above investigations and by the numerous observations called forth by the development of the great Darwinian theories, amongst which I may include a few points adverted to in a paper on Cassia which I laid before you last year, but which a press of matter has prevented our yet sending to press, it appears to me that, in plants at least, we may almost watch, as it were, the

process of specific change actually going on; or at least we may observe different races now living in different stages of progress, from the slight local variation to the distinct species and genus. As a first step we may take, for instance, those races which are regarded by the majority of botanists as very variable species, such as *Rubus fruticosus*, *Rosa canina*, *Zornia diphylla*, *Cassia mimosoides*, &c. We shall find in each some one form, which we call typical, generally prevalent over the greater part of the area of the race, whilst others, more or less aberrant, are more or less restricted to particular localities, the same varieties not occurring in disconnected stations with precisely the same combinations of character and in the same proportions; local and representative varieties and subspecies are being formed, but have not yet obtained sufficient advantages to prevent their being kept in check by their intercommunication (and, probably, cross-breeding) with their more robust type. The British Batologist or Rhodologist transported to the south of France or to Hungary will still find one, or perhaps two or three forms of Bramble and Dog-rose with which he is familiar; but if he wishes to discriminate the thirty or forty varieties or subspecies upon which he had spent so much labour and acuteness at home, he will find that he must recommence with a series of forms and combinations of characters quite new to him. The species is still the same; the varieties are changed. As examples of what we may call a second stage in the formation of species, we may adduce such plants as *Pelargonium australe* or *grossularoides* and *Nicotiana suaveolens* or *angustifolia*, to which I alluded in the above-mentioned paper on *Cassia*. Here we have one race, of no higher than specific grade in the ordinary acceptance of the term, inhabiting two countries which have long been widely dissevered (in the one case South Africa and Australia, in the other Chili and Australia), which, if originally introduced by accident from one country to the other, have been so at a time so remote as thoroughly to have acquired an indigenous character in both; in both they are widely spread and highly diversified; but amongst all their varieties one form only is identical in the two countries (*Pelargonium australe*, var. *erodioides*, and *P. grossularioides*, var. *anceps*; *Nicotiana suaveolens*, var. *angustifolia*, and *N. angustifolia*, var. *acuminata*), and that so comparatively a rare one that it may be regarded as being in the course of extinction; whilst all other varieties, some of them very numerous in individuals over extended areas, and all connected by nice gradations, diverge nevertheless in the two countries in different directions and with different combinations of characters, no two of them

growing in the two countries being at all connected but through the medium of that one which is still common to both. When that shall have expired, the distinct species may be considered established. A still further advance in specific change is exemplified in *Cassia* itself, in which I have shown that no less than eight or nine different modifications of type, sectional and subsectional, are common to South America, tropical Africa, and Australia, but without any specific or, at least, subspecific identity, except perhaps in a few cases where a more modern interchange may be presumed. The original common specific types are extinct, the species have risen into sections. Common types of a still higher order have disappeared in the case of Proteaceæ, an order so perfectly natural and so clearly defined that we cannot refrain from speculating on the community of origin of the African and of the Australian races, both exceedingly numerous and reducible to definite groups—large and small well-marked genera in both countries, and yet not a single genus common to the two; not only the species, but the genera themselves have become geographical. As in the case of the varieties of *Pelargonium* and *Nicotiana*, so in that of the species of *Cassia* and of the genera of Proteaceæ, it is not to be denied that precisely similar modifications of character are observed in the two countries; but these modifications are differently combined, the changes in the organs are differently correlated. In Asiatico-African *Chamæcristæ* a tendency to a particular change in the venation of the leaflet is accompanied by a certain change in the petiolar gland; in America the same change in the gland is correlated with a different alteration in the venation. In Australian Proteaceæ the glands of the torus are constantly deficient with a certain inflorescence (cones with imbricate scales) which is always accompanied by them in Africa.

In selecting the above instances for illustration of what we may, without much strain upon the imagination, suppose to be cases of progressive change in races, it is not that they are isolated cases or exceptionally appropriate; for innumerable similar ones might be adduced. In the course of the detailed examination I have had successively to make of the floras of Europe, N.W. America, Tropical America, Tropical Africa, China, and Australia, I have everywhere observed that community of general type, in regions now dissevered, is, when once varied, accompanied by more or less of divergence in more special characters in different directions in the different countries.

With regard to the succession of races which have undergone a

complete specific change through successive geological periods, we have not in plants, as far as I am aware, any such cases of "true linear types or forms which are intermediate between others because they stand in a direct genetic relation to them" as Professor Huxley appears to have made out in favour of the pedigree of the Horse in his last Anniversary Address to the Geological Society. And I may, in regard to plants, repeat with still greater emphasis his dictum, that "it is no easy matter to find clear and unmistakable evidence of filiation among fossil animals; for in order that such evidence should be quite satisfactory, it is necessary that we should be acquainted with all the most important features of the organization of the animals which are supposed to be thus related, and not merely with the fragments upon which the genera and species of the palæontologist are so often based." The difficulty is much greater in the case of fossil plants; for instead of bones, teeth, or shells, portions of internal or external skeletons, the parts preserved to us from the tertiary period are generally those least indicative of structural organization. Mr. Carruthers has recently (Geological Magazine, April and July 1869, and Journal of the Geological Society, August 1869) adduced satisfactory evidence of the close affinity of *Sigillaria* and the allied genera of the coal-period with the living Lycopodiaceæ, formerly suggested by Dr. Hooker; but, as he informs me, no connecting links, no specimens, indeed, of the whole Order, have as yet been found in any of the intermediate cretaceous or tertiary deposits. Among the latter, the presence of numerous vegetable types, to which we may plausibly refer as to the ancestors of living races, is established upon unimpeachable data; but I have been unable to find that a single case of authentic pedigree, as successively altered from the cretaceous through the abundant deposits of the eocene and miocene period to the living races, has been as yet as satisfactorily made out as that of the absolute identity of *Taxodium* and others above mentioned, although I feel very little doubt that such a one will yet be traced when our palæontologists shall have ceased to confound and reason alike upon the best-proved facts and the wildest guesses. Our late distinguished foreign Member, Professor Unger, whose loss we have had so recently to deplore, had indeed, shortly before his death, published, under the name of 'Geologie der europäischen Waldbäume, part 1. Laubhölzer,' no less than twelve tabular pedigrees of European forest races; but it seems to me that in this, as in another of the same eminent palæontologist's papers to which I shall presently have to refer, his speculations have been deduced much more freely from conjectures

than from facts. There is no doubt that the presence of closely allied representatives of our Beeches, Birches, Alders, Oaks, Limes, &c. in the tertiary deposits of Central and Southern Europe is fully proved by inflorescences and fruits as well as leaves; but how can we establish the successive changes of character in a race when we have only the inflorescence of one period, the fruit of another, and the leaf of a third? I do not find a single case in which all three have been found in more than one stage; and by far the great majority of these fossil species are established on the authority of detached leaves or fragments of leaves alone.

Now let us consider for a moment what place a leaf really holds in systematic botany. Would any experienced systematic botanist, however acute, on the sole examination of an unknown leaf, presume to determine, not only its natural order and genus, but its precise characters as an unpublished species? It is true that monographists have sometimes published new species founded on specimens without flower or fruit, which from collateral circumstances of habitat, collector's notes, general resemblance, &c. they had good reason to believe really belonged to the genus they were occupied with; but then they had the advantage of ascertaining the general *facies* derived from insertion, relative position, presence or absence of stipular appendages, &c., besides the data supplied by the branch itself. And with all these aids, even the elder De Candolle, than whom no botanist was more sagacious in judging of a genus from general aspect, proved to have been in several instances far wrong in the genus, and even Order, to which he had attributed species described from leaf-specimens only. Palæontologists, on the other hand, have, in the majority of these tertiary deposits, had nothing to work upon but detached leaves or fragments of leaves, exhibiting only outward form, venation, and, to a certain degree, epidermal structure, all of which characters may be referred to that class which Professor Flower, in his introductory lecture at the Royal College of Surgeons in February last, has so aptly designated as *adaptive*, in contradistinction to essential and fundamental characters. They may, when taken in conjunction with relative individual abundance, assist in forming a general idea of the aspect of vegetation, and thus give some clue to certain physical conditions of the country; but they alone can afford no indication of genetic affinity, or consequently of origin or successive geographical distribution.

Lesquereux, in speaking of cretaceous "species, or rather forms of leaves," observes, in a note to his paper on Fossil Plants from Nebraska (Silliman's Journal, vol. xlvi. July 1868, p. 103), that "it

is well understood that when the word *species* is used in an examination of fossil plants, it is not taken in its precise sense; for indeed no *species* can be established from leaves or mere fragments of leaves. But as palæontologists have to recognize these forms described and figured, to compare them and use them for reference, it is necessary to affix to them specific names, and therefore to consider them as species." But the investigators of the tertiary floras of Central and Southern Europe have acquired the habit, not only of neglecting this distinction and naming and treating these forms of leaves as species equivalent to those established on living plants, but of founding upon them theories which must fall to the ground if such specific determination proves inaccurate. Nothing can be more satisfactory than such determinations as that of *Podogonium*, for instance, which Professor Heer has succeeded in proving, by numerous specimens of leaves, fruits, and even flowers, some of them still attached to the branches, which I had myself the pleasure of inspecting last summer under the friendly guidance of the distinguished Professor himself. This genus of Cæsalpinieæ, from its evident affinity with *Peltogyne*, *Tamarindus*, and others now scattered over the warmer regions of America and Africa, and more sparingly in Asia, tells a tale of much significance as to the physico-geographical relations of the Swiss tertiary vegetation, confirmed as it is by some other, equally or almost equally convincing examples. But the case appears to me to be far different with the theory so vividly expounded by Professor Unger in 1861 in his Address entitled "Neu Holland in Europa." This theory, now generally admitted, seems to me to be established on some such reasoning as this:—There are in the tertiary deposits in Europe, and especially in the earlier ones, a number of leaves that look like those of Proteaceæ; Proteaceæ are a distinguishing feature in Australian vegetation; *ergo*, European vegetation had in those times much of an Australian type derived from a direct land communication with that distant region.

This conviction, that Proteaceæ belonging to Australian genera were numerous in Europe in eocene times, is indeed regarded by palæontologists as one of the best-proved of their facts. They enumerate nearly one hundred tertiary species, and most of them with such absolute confidence that it would seem the height of presumption for so inexperienced a palæontologist as myself to express any doubt on the subject. And yet, although the remains of the tertiary vegetation are far too scanty to assert that Proteaceæ did not form part of it, I have no hesitation in stating that I do not believe that

a single specimen has been found that a modern systematic botanist would admit to be Proteaceous unless it had been received from a country where Proteaceæ were otherwise known to exist. And, on other grounds, I should be most unwilling to believe that any of the great Australian branches of the Order ever reached Europe. As this is a statement requiring much more than mere assertion on my part, I shall beg to enter into some detail, commencing with a short summary of my grounds of disbelief in European tertiary Proteaceæ, and then examining into the supposed evidences of their existence.

The analysis and detailed descriptions I have had to make within the last few months of between five and six hundred Proteaceæ, and consequent investigation of their affinities and distribution, have shown that the Order as a whole is one of the most distinct and most clearly defined amongst Phanerogams. I do not know of a single plant intermediate in structure between that and the nearest allied Orders, which I cannot say of any other of the large Orders I have worked upon. There is, moreover, especially amongst the Nucamentaceæ, a remarkable definiteness in the majority of genera, without intermediate species, whilst the whole Order exhibits the greatest uniformity in some of its most essential characters, derived from the arrangement of the floral organs and the structure of the ovary and embryo, accompanied by a truly protean foliage. All this points, in my mind, to unity of origin, very great antiquity, and long isolation in early times. And the species themselves appear to be for the most part constitutionally endowed with what I designated in my last year's Address as individual durability rather than with rapidity of propagation. The Order may be divided into about five principal groups, more or less definite in character, but very different in geographical distribution. First, the Nucamentaceæ (from which I would exclude *Andripetalum* and *Guevina*), which we may suppose to be the most ancient, and perhaps the only one in existence when Proteaceæ inhabited some land in direct communication, either simultaneously or consecutively, with Extratropical Africa and Australia; for it is the only group now represented in the former. It is preeminently endowed with the characteristic definiteness and durability of the Order. It is very natural as a whole; it has about 250 species in eleven distinct African genera, and nearly 200 species in twelve equally distinct Australian genera, no single genus common to the two countries, and the species mostly abundant in individuals, in very restricted localities. In both countries it is chiefly confined to the south. Africa sends

only one or two species northward as far as Abyssinia. The Australian portion has extended to New Zealand, where it has left a single species, now quite differentiated from the Australian ones; very few species (not half a dozen) have reached Tropical Australia; and, if ever it extended further, no representatives have yet been discovered in America, Asia, or even in New Caledonia. The four remaining groups, constituting the Folliculares, must have all been formed since the isolation from Africa. 1. Banksieæ, two genera, with above 100 species, have the type of distribution of the Australian Nucamentaceæ, chiefly southern, local, and abundant in individuals, with three or four species penetrating into the tropics, but none beyond Australia. 2. Grevilleeæ, in which the genera are somewhat less definite and the distribution more extended, have above 300 species in about eight genera, of which the greater portion are still southern and local, but yet a considerable number are tropical, and a few extend to New Caledonia, although none beyond that. 3. Embothrieæ, with about twenty-five species in half a dozen genera, form part of that southern, chiefly mountain, flora which extends from Tasmania and Victoria to New Zealand, Antarctic and Chilian America, a flora which comprises many species which we might imagine to have spread from the northern hemisphere down the Andes to Antarctic America, and thence to New Zealand and Australia, whilst others may have extended in a contrary direction; and amongst these we may conjecturally include the Embothrieæ, which in America are not found further north than Chile; whilst in Australia, although chiefly from the southern and eastern mountains, two or three species are northern, and one or two more are found in New Caledonia, but none in the Indian archipelago, nor in Continental Asia. 4. We have lastly the tropical form of Proteaceæ, the Heliciæ, which are but a slight modification in two different directions (modifications either of the flower or of the fruit) of the *Grevillea* type, probably of a comparatively recent date, and, although now widely spread over South America and Asia, have nevertheless left representatives in the original *Grevillea*-regions of Australia. There are nearly 100 species in about eight genera, almost all tropical or subtropical; three small genera are exclusively Australian; *Helicia* itself is Asiatic, chiefly from the Archipelago, extending, in four species, to Tropical Australia, in one or two species to New Caledonia, in two or three northward to the mountains of Bengal and Sikkim, and in one species even to Japan. Two American genera, with about forty species, are represented in New Caledonia by one genuine species of

each and one of an allied genus or section, and in Tropical Australia by one species showing still the Australian connexion; and two small genera are, as far as hitherto known, exclusively American, and may have been there differentiated. No Heliciee, nor indeed as already observed, any Folliculares, have hitherto been discovered in Africa. If, therefore, Proteaceæ have really ever extended to Europe, it would naturally be in this Helicioid group that we should seek for them. As far, however, as I can learn, among the supposed century of European Proteaceæ, there is only one which palæontologists refer to it, the *Helicia sotzkiana* of Ettingshausen, founded on a single leaf, which Ettingshausen himself admits to bear much resemblance to the leaves of about twenty genera in thirteen different families; and, upon much consideration, he thinks it rather more like an *Helicia* than any thing else, and therefore definitively names it as such—a decision in which it is difficult to concur.

In answer to the above negative considerations, which, after all, lead to presumption only, we are told that we have positive evidence of the existence of Proteaceæ in the miocene, and still more in the eocene formations of Europe, in leaves, fruits, and seeds. As none of these have been found attached to the branches, nor even in sufficiently abundant proximity to be matched with any thing like certainty, we must take the three separately. First, as to seeds, those referred by palæontologists to Proteaceæ are winged and samaroid, some of them probably real seeds, shaped, without doubt, like those of some *Hakeæ* and *Embothria*, but quite as much like those of several Coniferæ, or of certain genera of Meliaceæ, Sapindaceæ, and various other Dicotyledonous Orders, there being no evidence of internal structure, conformation of the embryo, &c., by which alone these several samaroid seeds can be distinguished. Moreover those figured by Ettingshausen in his paper entitled "Die Proteaceen der Vorwelt" (Proc. Imp. Acad. Sc. Vienna, lvii. 711, t. xxxi. f. 11, 12, 14, 15, and δ) have a venation of the wing very different from that of any Proteaceæ I have seen, and much more like that of a real samara of an ash. Next, as to fruits, the hard follicles or nuts of Proteaceæ are as remarkable for their durability as the capsules of so many Australian Myrtaceæ; and we should be led to expect that, where Proteaceous remains are abundant, they should include a fair proportion of fruits, as is the case with the Conifers, Leguminosæ, &c. which have been undoubtedly identified. These supposed Proteaceous fruits in the tertiary deposits, however, are exceedingly rare. The only ones I have seen figured are:—

1, a supposed *Embothrium*-fruit figured by Heer in his Tertiary flora of Switzerland, t. xcvii. f. 30, an outline impression, with a deficiency in the upper portion, and without indication of internal structure; if this deficiency were filled up, and the seeds inserted, as in the imaginary restoration, f. 31 (for which I see no warrant, and in which the seeds are in the wrong position), it would be something like, but to my eyes not much like, the follicle of an *Embothrium*, and quite as much like what Ettingshausen figures (t. xxxi. f. 5) as the veinless leaf of a *Lambertia*; and, 2, the supposed *Persoonia* and *Cenarrhenes* drupes figured by Ettingshausen (t. xxx.): the former, in the absence of all indication of structure, are quite as good, if not better, representations of young fruits of *Ilex*, *Myoporum*, and many others, as of *Persoonia*; and where, in figures *c* and *d* of the same plate recent (unripe) Persoonia fruits are inserted, for comparison with the fossil figures β, γ, and δ, it appears to me that in the latter the long point is the pedicel, and the short point the style, whilst in the former, on the contrary, the short point is the pedicel, and the long one the style. To suppose that fig. 5 of the same plant represents the fruit of a *Cenarrhenes*, which, as far as known, has always an obliquely globular drupe, requires indeed a great strain upon the imagination. I can find no other fossil Proteaceous fruit figured or described.

Lastly, with regard to leaves, necessarily the main stay of palæontologists, I must admit that there is a certain general *facies* in the foliage of this Order that enables us in most, but not in all cases to refer to it with tolerable accuracy leafy specimens known to have come from a Proteaceous country, even without flowers or fruit; but as to detached leaves, I do not know of a single one which, in outline or venation, is exclusively characteristic of the Order, or of any one of its genera. If we know the genus and section of a specimen, we may determine its species by the venation; and we may sometimes fairly guess at its genus if we know it to be Proteaceous; but that is all. Outline is remarkably variable in many species of *Grevillea* and others; and venation is not always constant even on the same individual. But then we are told, with the greatest confidence, that the structure of the stomata in these fossil leaves, as revealed by the microscope, proves them beyond all doubt to be Proteaceous. In reply to that, I can only refer to the highest authority on these curious organs, Hugo Mohl, who, in a very careful and elaborate memoir specially devoted to the stomata of Proteaceæ, has the following passage (Vermischte Schriften, p. 248):—"Striking as is the above-described structure of the

stomata in Proteaceæ, we should nevertheless not be justified in regarding this as a peculiarity of this family; for all the variations which we meet with in the structure of the stomata in Proteaceæ are also to be found in plants belonging to widely distant Orders."

From the above considerations, I cannot resist the opinion that all presumptive evidence is against European Proteaceæ, and that all direct evidence adduced in their favour has broken down upon cross-examination. And however much these eocene leaves may assume a general character, which may be more frequent in Australia (in Proteaceæ and other Orders) than elsewhere, all that this would prove would be, not any genetic affinity with Australian races, but some similarity of causes producing similarity of adaptive characters.

Another series of conclusions drawn by palæontologists from their recent discoveries, which appears to me to have been carried too far, relates to the region where a given species originated. The theory that every race (whether species or group of species derived from a single one) originated in a single individual, and consequently in one spot, from which it has gradually spread, is a necessary consequence of the adoption of Darwinian views; and when Mr. R. Brown ("On the Geographical Distribution of Conifers," Trans. Bot. Soc. Edinb. x. p. 195) sneers at my having qualified it as a perfect delusion, he must have totally misunderstood, or rather misread the passage he refers to in my last year's Address. The expression is there specially applied to the idea of general centres of creation whence the whole flora of a region has gradually spread, in contradistinction to the presumed origin of individual races in a single spot, which is there as distinctly admitted. The determination of where that spot is for any individual race, is a far more complicated question than either geographical botanists or palæontologists seem to suppose. "Every vegetable species," as well observed by Professor Heer, "has its separate history," and requires a very careful comparison of all the conclusions deducible as well from present distribution as from ancient remains. The very important fact that *Taxodium distichum*, *Sequoiæ*, *Magnoliæ*, *Salisburia*, &c. existed in Spitsberg in miocene times, so satisfactorily proved by Heer, shows that the vegetation of that country then comprised species and genera now characteristic of North America; but it appears to me that the only conclusion to be drawn (independently of climate and geology) is, that the area of these species and genera had extended continuously from the one country to the other, either at some one time, or during successive periods. The proposition that

"Spitsberg appears to have been the focus of distribution of *Taxodium distichum*," because an accidental preservation of its remains shows that it existed there in the lower miocene period, would require at least to be in some measure confirmed by a knowledge of the flora of the same and preceding periods over the remainder of its present area, the greater part of which flora, however, is totally annihilated and for ever concealed from us. The fact that *Pinus abies* existed in Spitsberg in miocene times, and that no trace of it has been found in the abundant tertiary remains of Central Europe is very instructive. It might show that that tree was of more recent introduction into the latter than the former country; but it cannot prove that it was not still earlier in some other region, whence it may have spread successively into both territories, still less that its course of dissemination was directly from Spitsberg over Northern and Central Europe. Moreover the determination of *Pinus abies* is not so convincing as that of the *Taxodium*, resting as it does, if I correctly understand Prof. Heer's expression, on detached seeds and leaves, with a few scales of one cone, and may require further confirmation.

In the above observations it is very far from my wish to detract from the great value of Professor Heer's researches. Interested as I have been in the investigation of the history of races of plants, I have deeply felt my general ignorance of palæontology, and consequent want of means of checking any conclusions I may have drawn from present vegetation by any knowledge of that which preceded it, and the impossibility at my time of life of entering into any detailed course of study of fossils. Like many other recent botanists, I am obliged to avail myself of the general results of the labours of palæontologists; and if I have here ventured on a few criticisms, it is only as a justification of the hope that they may in some measure distinguish proved facts from vague guesses, in order that we may know how far reliance is to be placed on their conclusions.

Spontaneous generation, or Heterogeny, is a question which continues to excite much interest. It has been the subject of detailed memoirs, of violent controversies, and of popular articles in this country, and still more on the Continent; but the solution of the problems still involved in doubt does not seem to me to have much advanced since I alluded to the opposing theories of Pasteur and Pouchet in my Address of 1863. The present state of the case appears to me to be this: in the higher Orders of Animals every individual is known to proceed from a similar parent after sexual pairing; in most plants, and some of the lower animals, besides the

result of that sexual pairing which they all are endowed with, reproduction from the parent may take place by the separation of buds, by division, or sometimes by parthenogenesis; in some of the lower Cryptogams, the first stage in which the new beings are separated from the parent is that of spores termed agamic, from the belief that they never require previous sexual pairing, although the range of these agamic races is being gradually restricted, a remarkable advance having been recently made in this direction by Pringsheim in his paper on the pairing of the Zoospores in *Pandorina* and *Eudorina*. In all the above cases, in all organized beings which in their earliest stages are appreciable through our instruments, every individual has been proved to have proceeded in some stage or another from a similarly organized parent. But there are cases where living beings, Vibrios, Bacteria, &c., first appear under the microscope in a fully formed state, in decaying organic substances in which no presence of a parent could be detected or supposed. Three different theories have been put forward to account for their presence: 1st, that they are suddenly created out of nothing, or out of purely inorganic elements, which is perhaps the true meaning disguised under the name of spontaneous generation, a theory not susceptible of argument, and therefore rejected by most naturalists as absurd; 2ndly, that they are the result of the transformation of the particles of the organic substances in which they are found, without any action of parent Vibrios or Bacteria; and this appears to be what is specially termed Heterogeny; 3rdly, that there existed in these organic substances germs which had proceeded from parent Vibrios and Bacteria, but too minute for optical appreciation, and that their generation was therefore normal. The supporters of Heterogeny rely on the impossibility of accounting for the appearance of the Vibrios and Bacteriums in any other manner; for they say that although you treat the medium by heat in an hermetically closed vessel in such a manner as to destroy all germs, and intercept all access, still these beings appear. This their opponents deny, if the experiments are conducted with proper care. So it was seven years ago; and so it is still, although the experiments have been frequently repeated in this country, in France, and in North America, almost always with varying results. All reasoning by analogy is still in favour of reproduction from a parent; but Heterogeny has of late acquired partisans, especially in Germany, among those who are prepared to break down the barriers which separate living beings from inorganic bodies.

Brown's celebrated theory of the gymnospermy of Conifers and

allied Orders has been of late the subject of keen controversy. Objected to by Baillon, Parlatore, and others, it had been strongly supported by Caspary, Eichler, and, lastly, by Hooker in his important Memoir on *Welwitschia*, published in our Transactions in 1863. There the question seemed to rest till last year, when two detailed papers appeared, the one contesting, the other advocating the theory. The most elaborate is without doubt that of Gustav Sperk in the Memoirs of the Imperial Academy of Sciences of St. Petersburg. He gives a very fair *résumé* of all that had been published on the subject, and proceeds to record in detail his own observations on the structure and anatomy of the flower in a considerable number of Coniferæ, of *Ephedra alata*, *Gnetum latifolium*, and two species of *Cycas*, illustrated by well-executed analytical figures. He endeavours to prove, chiefly by their anatomy and development, that the coating which encloses the nucleus is carpellary, not ovular, of independent origin, always free, and often earlier developed than the nucleus,—that what is wanting in gymnosperms is not the ovarium or carpellary envelope, but the ovular coating,—that these plants are in fact gymnosperms in the sense of having naked nuclei and embryo-sacs, not naked ovules.

P. Van Tieghem, on the contrary, in the 'Annales des Sciences Naturelles,' ser. 5, vol. x., considers the gymnospermy of the ovules of Conifers to be proved by the anatomical structure of the organs on which they rest. He says that, as in normal Dicotyledons, the ovules are developed from, and continuous with, the margins of carpellary leaves, but these carpellary leaves are open, variously or imperfectly developed, and constitute solitary leaves on a secondary branch in the axil of the subtending bract, this secondary branch being arrested in its development, and the carpellary leaf facing the bract; the paper is illustrated by a large number of diagrams. These two Memoirs, published simultaneously at St. Petersburg and at Paris, contain of course no reference to each other. How far each author may or may not have proved his case, I cannot now take upon myself to inquire into. Neither of them appears to have had any knowledge of the views of Professor Oliver, who in his review of Hooker's Memoir on *Welwitschia* (Nat. Hist. Review, 1863) suggests the analogy of the disputed organ with the axial developments known under the name of floral disks. Both writers, however, confirm the anomalous structure of the flower in this great class of plants, and the position of the plants themselves in many respects intermediate between the higher Cryptogams and Dicotyledons, their connexion with the former being clearly shown by the

researches of Carruthers and other palæontologists, and with Dicotyledons through *Welwitschia* by Hooker in his above-mentioned Memoir.

Teratology is a subject which has again risen into importance as aiding in the history of the variations worked upon by natural selection in the formation of species. There had always been a tendency to attribute monsters and prodigies, whether in the organic or the inorganic world, to an infraction of the laws by which natural phenomena are regulated, by the immediate interposition *ad hoc* of a supreme will for temporary motives inscrutable to man, in which all that the man of science was called upon to do was to establish their authenticity, and detail their abnormities. This, however, was considered by D'Alembert sufficient to constitute Teratology as one of the great branches of Natural History taken in its most extended sense; for in his once celebrated 'Système Figuré des Connaissances Humaines,' *Histoire Naturelle* has three great branches:—*Uniformité de la Nature*, or the study of the laws which govern the organic or inorganic world, terrestrial and celestial; *Ecarts de la Nature*, the science of prodigies and monsters; and *Usages de la Nature*, or arts and manufactures. Jeremy Bentham, in his 'Essay on Nomenclature and Classification,' of which I published a French edition now nearly half a century since, strongly criticised such a classification, "by which a middle-sized man is placed in one niche, a tall man and a short man together in another"*. Mr. Galton, however, in his recently published interesting researches on Hereditary Genius, shows us, after Quetelet, that even in this respect the laws which govern the deviations from the average height of man, both above and below that average, are uniform under similar conditions, and may well be studied together. We may not, indeed, with D'Alembert, combine the history of animal and vegetable monstrosities with that of mineral monsters and celestial prodigies (whatever these may be); but the course which Biology has taken in the last few years has shown the necessity of accurately investigating in each branch all observed departures from what appears to be the ordinary course, before the real laws of that ordinary course can be ascertained. A work, therefore, in which these observed aberrations are carefully collected, tested, and methodized, cannot fail to be of great use to the physiologist; and such a work with regard to plants (the want of which, brought down to the present state of the science, I alluded to in my Address of 1864) has now been provided for us by Dr. Masters, in his 'Vegetable Teratology'—a work which we should especially

* Essay on Nomenclature and Classification, or *Chrestomathia*, part ii. 1817, p. 157; French edition, 1823, p. 48.

like to see deposited in local libraries at home and abroad, to which observers resident in the country could have ready access. Monstrosities or deviations from the ordinary forms in plants are comparatively rare and evanescent; they can be best observed in their fresh state, and often require watching in the course of their development. Country residents have the best means of doing so; and to them it is very important to have a systematic work at hand by which they can ascertain whether the aberration they have met with is one well known, or of frequent occurrence, or whether it presents any new feature, adding another item to our store of data, and therefore requiring closer observation and accurate record.

In making use, however, of Teratology in explanation of structure and affinities, great care is required. It is not every one who can handle these phenomena with the tact of a Darwin. In the course of my systematic labours I have met with several instances where teratologists have been led into conclusions which have proved to be far wide of the truth, owing to their having confined themselves to teratology to the neglect of homology and organogeny. This importance of teratological facts to the physiologist who is able duly to appreciate their bearing, and the discredit cast on their study owing to their misuse in hasty and incautious speculations, are alluded to in Dr. Masters's Introduction. But beyond some explanations of causes suggested by the bringing together series of facts showing a physiological connexion with each other and with more normal formations, he enters little into the various questions the solution of which has been more or less attempted by the aid of teratology. These questions, indeed, could not have been discussed without fully working out on each occasion normal organogeny, development, and homology, and thus leading him far beyond the object of the present work, which was to present to the future physiologist such a digested record of facts as should best show their relative bearing to each other, to normal conditions, and to any observed causes of disturbance. This object appears to have been well fulfilled, and the method adopted by the author probably the best suited to the purpose. A classification founded upon the nature of the causes inducing the several changes might, indeed, as he observes, have been theoretically the best, but is wholly impracticable until these causes shall have been satisfactorily ascertained. For the inquiry into these causes this teratological digest supplies a record of one class of facts, a necessary one, but only one of many classes on which it must be founded.

The Secretary reported that the following Members had died, or their deaths been ascertained, since the last Meeting:—

FELLOWS.

The Rev. John Barlow.
Edward William Brayley, Esq.
Gen. Sir W. M. G. Colebrooke.
Jonathan Couch, Esq.
John Hogg, Esq.
Sir William Charles Hood, M.D.
Peter Jones, Esq.
George Cranmer Kenrick, Esq.
Charles J. Meller, M.D.
Charles Prideaux, Esq.
Captain Charles Sturt.
James Veitch, Esq.
Joseph Walker, Esq.
James Lowe Wheeler, Esq.

FOREIGN MEMBERS.

Carl Gustav Carus, M.D.
Giuseppe Giacinto Moris, M.D.
Johann Evangelista Purkynje, M.D.
Michael Sars, Ph.D.
Franz Xavier Unger, M.D.

ASSOCIATE.

John William Salter.

The Secretary also announced that nineteen Fellows and five Foreign Members had been elected since the last Anniversary.

At the Election which subsequently took place, George Bentham, Esq., was re-elected President; William Wilson Saunders, Esq., Treasurer; and Frederick Currey, Esq., and H. T. Stainton, Esq., Secretaries. The following five Fellows were elected into the Council, in the room of others going out, viz.:—Thomas Anderson, M.D., John Ball, Esq., Michael Foster, M.D., Henry Lee, Esq., Major F. J. S. Parry.

Mr. A. W. Bennett, on the part of the Auditors of the Treasurer's Accounts, read the Balance-sheet, by which it appeared that the total Receipts during the past year, including a Balance of £381 4*s*. 4*d*. carried from the preceding year, amounted to £1569 1*s*. 8*d*., and that the total Expenditure during the same period (including the purchase of £100 Great Indian Peninsula Railway Debenture) amounted to £1318 12*s*. 1*d*., leaving a Balance in the hands of the Bankers of £250 9*s*. 7*d*.

Receipts and Payments of the Linnean Society from May 1, 1869, *to April* 30, 1870.

Receipts	£	s.	d.	£	s.	d.
Balance in the hands of the Bankers at the last audit ...				381	4	4
Admission Fees	120	0	0			
Compositions	240	0	0			
Annual Contributions of £2 2*s.*	25	4	0			
Do. do. of £3 0*s.*	591	0	0			
Transactions, Journal, &c. sold	130	9	3			
Interest on Consols and other Investments	63	13	5			
Expenses of warming, lighting, tea, &c., repaid by other Societies	17	10	8			
				1187	17	4
				£1569	1	8

Payments	£	s.	d.
Insurance	6	0	0
Repairs and Furniture	3	10	0
Coals, Gas, Tea, Postage, &c.	97	7	9
Salaries	215	0	0
Expenses of the Society's Publications	825	10	1
Books purchased	42	19	11
Bookbinding and Stationery	22	16	1
Commission	15	1	7
	£1228	5	5
Invested in Great Indian Peninsula Railway Debenture	90	6	8
Balance in the hands of the Bankers	250	9	7
	£1569	1	8

W. WILSON SAUNDERS, *Treasurer.*

The foregoing Accounts have been examined, and the Balance in hand found to be correctly stated at £250 9*s.* 7*d.*

GEORGE BENTHAM, *President.*
R. C. A. PRIOR,
ALFRED W. BENNETT.

DANIEL HANBURY,
HENRY LEE,
FREDERICK CURREY.

May 20th, 1870.

OBITUARY NOTICES.

The Secretary then read the following notices of deceased *Members*.

The Rev. John Barlow, M.A., F.R.S., was born at Halberton, in Devonshire, of which parish his father was the Vicar. He was educated at Tiverton School and at Trinity College, Cambridge, where he took high honours. He was for a short time Rector of Little Bowden, near Market Harborough; but from the weak state of his health, he found himself unfitted for clerical work, and went to reside in London. The late Prince Consort offered him the post of Chaplain to the Household at Kensington, which he accepted, and held until the year before his death. From 1842 to 1860, Mr. Barlow was Honorary Secretary of the Royal Institution, for which post he was well qualified, both by his scientific acquirements and his social position. He was an intimate friend of the late Professor Faraday, to whom he was able to afford considerable assistance in the affairs of the Institution; and many of the members and their friends will entertain a kindly recollection of the hospitality shown by Mr. and Mrs. Barlow at the Friday evening gatherings in their house in Berkeley Street. Mr. Barlow died on the 8th of July, 1869. He was elected a Fellow of our Society on the 2nd of June, 1829.

Edward William Brayley, F.R.S., was born in the year 1801. He was a pupil at the Royal Institution under the late Professor Brande, and in 1822 he joined the staff of the 'Philosophical Magazine' and the 'Zoological Journal,' to both of which he contributed many original papers, besides notices on chemistry, geology, zoology, and astronomy. He was also the author of a "Report on Observations of Luminous Meteors," which was published in the 'Report of the British Association for 1863,' and of papers upon the constitution and functions of the sun, which appeared in the 'Companion to the British Almanac.' At the London Institution he delivered for some years a systematic course of lectures upon geology, palæontology, and astronomy; and he also lectured at the Royal Institution upon volcanoes and igneous geology. In 1859 Mr. Brayley communicated to the Royal Society a memoir entitled "On the apparent universality of a principle analogous to gelatine, on the physical nature of glass, and on the probable existence of water in a state corresponding to that of glass." This communication was published in the tenth volume of the 'Proceedings of the Royal Society.'

Mr. Brayley was a gentleman of very extensive reading and information, and he was always ready to afford assistance in any matter of scientific investigation or pursuit, especially to the readers at the London Institution, at which he was the Principal Librarian, as well as Professor of Physical Geography and Meteorology.

He died suddenly of heart-disease on the 1st of February, 1870, in the 69th year of his age, having been elected a Fellow of our Society on the 2nd of December, 1834.

Carl Gustav Carus was born on the 3rd of January 1789 at Leipsic. His father was a dyer by trade, and the future Anatomist and Physiologist commenced life with the study of Chemistry, in order that he might be able to assume the direction of his father's establishment. Subsequently, however, he turned his attention to medicine. He delivered private lectures at the University of Leipsic on the science of Comparative Anatomy, the study of which received at that time a great impetus from the teachings of Cuvier.

During the war of 1813 he was at the head of the French Hospital at Pfaffendorf, near Leipsic, and in the following year was appointed Director of the Institution of Clinical Obstetrics at Dresden, and Professor at the Medico-Chirurgical Academy in that capital. Having received the appointments of Court Physician and Councillor of State, he accompanied, in 1827, the Prince of Saxe on his travels in Italy and Switzerland.

On his return to Dresden, he gave himself up to painting, which he cultivated with considerable success. His scientific reputation, nevertheless, was fully maintained, and in 1859 he was named Corresponding Member of the French Institute.

The following are among the more important of the numerous works and papers published by him.

1. 'Versuch einer Darstellung des Nerven-Systems, und insbesondere des Gehirns,' 1814.

2. 'Traité de Gynekologie,' 1820.

3. 'Erläuternde Tafeln zur vergleichenden Anatomie,' a work of great value, which was published in Parts, from 1826 to 1855, and includes 74 Plates.

4. 'Grundzüge der vergleichenden Anatomie und Physiologie,' 1828.

5. 'System der Physiologie,' 1838–40.

6. 'Grundzüge der Cranioskopie,' 1841.

7. 'Atlas de Crânioscopie,' 1843–1844.

8. 'Beobachtung einer sehr eigenthümlichen Schimmelvegetation (*Pyronema Marianum*) auf Kohlenboden' (Acta Acad. Nat. Cur. tom. xvii.), 1834.

But besides these he wrote several works on metaphysical subjects, Landscape Painting, Travels in France, England, Scotland, &c.

He was elected a Foreign Member of our Society on the 7th of May, 1839, and died at Dresden on the 28th of July, 1869, in his 82nd year.

General Sir William Macbean George Colebrooke, of the Royal Artillery, was the son of the late Colonel Paulette William Colebrooke, of the Royal Artillery, and was born in 1787. He received his early education for the service at Woolwich, and obtained his first commission in the Royal Artillery in 1803. In 1810 he served as Captain in the Island of Java, where he was wounded. In 1812 he served in the same island as Deputy Quartermaster General. He took part in the Mahratta war in 1817, and in the expedition to the Persian Gulf in 1818. From 1823 to 1831 he held the post of Commissioner of Eastern Inquiry.

In 1834 he was appointed to the Governorship of the Bahama Islands, and in 1837 to the Governorship of the Leeward Islands. From 1841 to 1848 he held the post of Lieutenant-Governor of New Brunswick, and he was then nominated Governor and Commander-in-Chief of British Guiana. Shortly after the latter appointment he was transferred to the Governorship of Barbadoes, which he held down to 1856. With this year his active public services appear to have ended, and on his return to England he settled down in the neighbourhood of Windsor, where he spent the latter years of his life. He attained the rank of Major-General in 1854, and of Lieutenant-General in 1859. He was honoured with the Knighthood of the Hanoverian Order by King William in 1834, and was nominated a Companion of the Bath (Civil Division) in 1848. He died at his residence at Salt Hill, near Slough, on the 6th of February, 1870. He was elected a Fellow of our Society on the 5th of November, 1822.

Jonathan Couch was born at Polperro, in Cornwall, on the 15th of March, 1789. He was educated at the Grammar School at Bodmin, and afterwards, having studied as a pupil at the Hospitals of St. Thomas's and Guy's, he adopted the medical profession. He devoted, however, much of his time to the study of Natural History, and was the editor of the annotated edition of 'Pliny's Natural History,' published by the Wernerian Club. He afforded much assistance to Bewick when that naturalist was engaged in preparing a 'Natural History of British Fishes,' and he also took a large share in furnishing the materials for Mr. Yarrell's great work 'The His-

tory of British Fishes.' In 1843 he published Parts 1 & 2 of 'The Cornish Flora.' His work on 'The Illustrations of Instinct' appeared in 1847, and his 'History of the Fishes of the British Isles' was issued in parts in the years from 1860 to 1865. In 1868 he was awarded a Gold Medal at the International Piscicultural Exhibition held at Havre, for a paper on the economic uses of fisheries. Mr. Couch was a contributor both to the Transactions and the Journal of our Society. His papers in the Transactions are to be found in the fourteenth and eighteenth volumes, the first entitled "Some Particulars of the Natural History of Fishes found in Cornwall," and the second, "Notice of the Occurrence of *Procellaria Wilsoni* on the British Coast." His papers in the Journal are five in number, and appeared in the first, second, fifth, sixth, and ninth volumes, the subjects being (in the order in which they appeared)—1. "On the Occurrence of *Sepia biserialis* in Cornwall;" 2. "Note on the Occurrence of *Phyllosoma commune* on the coast of Cornwall;" 3. "Discovery of *Alpheus Edwardsii* on the Coast of Cornwall;" 4. "Note on the Occurrence of the Crustacean *Scyllarus arctus* in England;" and 5. "Some Account of a newly-discovered British Fish of the Family Gadidæ and the Genus *Couchia*." Besides those already mentioned, Mr. Couch was the author of several other papers on subjects connected with natural history, including geology. In the 'Catalogue of the Royal Society' the titles of fifty-six papers are given, and it has been said that that list is by no means a complete one.

Besides his acquirements in Natural History, Mr. Couch devoted a considerable time to Archæology, and he was also an accomplished linguist, having been acquainted with Hebrew and Syriac, besides several modern languages. He was elected a Fellow of our Society on the 16th of March, 1824, and died at Polperro on the 13th of April, 1870, in the 82nd year of his age.

John Hogg, M.A., F.R.S., was a native of Norton, near Stockton-on-Tees, in the County of Durham, where he was born in the year 1800. He was educated at St. Peter's College, Cambridge, where he took the degree of B.A. in 1822, and of M.A. in 1827. For three years from 1823 he was a Travelling Bachelor of the University, and he became a Fellow of St. Peter's College on the Ramsey Foundation in 1827. As Travelling Bachelor, he visited Sicily and other parts of Southern Europe. His tour in Sicily was made in the spring of 1826; and he afterwards published, as one of its results," "Observations on some of the Classical Plants of Sicily," which appeared in the first volume of Hooker's 'Journal of Botany.' He also published

a paper "On the Geography, Geology, and Vegetation of Sicily," in the 3rd volume of 'Loudon's Magazine of Natural History' (1830), and "A Catalogue of Sicilian Plants, with some remarks on the Geology and Geography of Sicily," in the 10th volume of the 'Annals of Natural History' (1842). Mr. Hogg was a frequent attendant at our meetings, and made at different times several contributions to our publications, amongst which may be mentioned three papers upon *Spongilla fluviatilis*, in which he contended that the River Sponge belonged to the vegetable kingdom, and claimed priority over Mons. Laurent as the discoverer of the locomotive germ-like bodies of *Spongilla*.

Mr. Hogg died on the 16th of September, 1869, at Norton House, Stockton-on-Tees. He was elected a Fellow of our Society on the 5th of March, 1822.

Sir William Charles Hood, Knight, was born in the year 1825. He studied at Guy's Hospital and became a Doctor of Medicine of the University of St. Andrew's in 1846. In 1863 he became a Fellow of the Royal College of Physicians of London. From 1849 to 1852 he was one of the resident medical officers of Colney Hatch Lunatic Asylum. He subsequently obtained the appointment of Resident Physician to Bethlem Hospital, which office he held until 1864, when he was appointed one of the Lord Chancellor's Visitors of Lunatics. He was afterwards elected Treasurer of the united Hospitals of Bethlem and Bridewell. Sir William C. Hood was an able and intelligent observer, who enjoyed large opportunities for gaining experience in all the phases of mental disorder. He was the author of various essays on insanity, the chief of which were 'Suggestions for the future Provision of Criminal Lunatics,' published in 1854; 'Statistics of Insanity, being a Decennial Report of Bethlem Hospital from 1846 to 1855;' 'Statistics of Insanity continued and republished from 1846 to 1860.' Sir W. C. Hood was also the author of papers on "The Pathology of Insanity" in the 'Psychological Journal.' In the performance of his professional duties he had to make a lengthened journey in the middle of winter, at a time when his failing health required a complete cessation from work. The exertion seems to have been too great for him, and he died at Bridewell Hospital on the 4th of January, 1870, at the age of 45. He was elected a Fellow of our Society on the 21st of January, 1858.

Mr. Peter Jones, late of Norton Folgate, was born in the year 1808. He was in his youth a student at the Birkbeck Mechanics' Institution, where he was remarkable for his attachment to the pursuit of Natural History, especially Botany, and where he also

acquired a knowledge of Mineralogy and Chemistry. Having passed through his period of studentship he became a lecturer on Chemistry, in which he attained considerable success, having lectured at the Marylebone Institution, at the Metropolitan, at Salvador House, and other literary and scientific institutions. He afterwards established himself in Norton Folgate as a scientific and manufacturing chemist, and commenced business by a series of conversaziones at his house, which were rendered attractive by the exhibition of objects of natural history, and by Mr. Jones's familiarity with the use of the microscope in the investigation of such objects. He was a Fellow of the Royal Microscopical Society, to which he was elected on the 12th of December, 1860. On the 20th of June, 1861, he was elected a Fellow of our Society, and was a frequent attendant at our meetings. He died rather suddenly of angina pectoris, on the 15th of March, 1870, in the 62nd year of his age.

George Cranmer Kenrick, M.R.C.S., was a younger son of a Lincolnshire squire. In early life he was a pupil of Abernethy, and attended lectures at St. Bartholomew's Hospital and at the London Hospital. At the latter Institution he for a time filled the office of House Surgeon. Mr. Kenrick first settled in general practice at Uxbridge, but after a short residence there he removed to Melksham, in Wiltshire, where for many years he was a leading practitioner. His professional engagements left him but little leisure, but he took great interest in Botany and other branches of Natural History, and in science generally, and some portion of his spare time was devoted to painting. He was a man of taste and refinement, and was highly respected for his professional skill as well as his great benevolence and kindness to the poor. Failing health compelled him to withdraw from practice. He passed a winter in Italy, but on his return he gradually grew worse, and died on the 13th of November, 1869, at the age of 63, after a painful illness, borne with courage and patience. He was elected a Fellow of our Society on the 21st of February, 1832.

Dr. Charles James Meller was born in the year 1836, and was educated for the medical profession. He became a Member of the Royal College of Surgeons of England in 1857. He subsequently travelled in Africa with Dr. Livingstone, and also in Madagascar, and during those journeys suffered much from attacks of fever. He was afterwards appointed Superintendent of the Botanic Gardens at the Mauritius, and in the course of the last year was instructed by the Government of that island to collect different varieties of the sugar-cane. In furtherance of this object he proceeded to Queens-

had, intending afterwards to visit some of the Pacific Islands and other places. At Queensland he collected and forwarded to the Mauritius a large quantity of sugar-canes. Unfortunately he was at Queensland at the hottest season of the year, and he was taken ill with a renewed attack of his former fever. With some difficulty he was removed to Sydney, where he arrived in a seriously debilitated state. It was thought advisable that he should be removed to a cooler part of the country, and Berrima was fixed upon, a place about eighty-three miles from Sydney, rather more than 2000 feet above the level of the sea, and having a cool mountain air. He did not, however, derive the benefit which was hoped for; the debility from which he was suffering increased, and he died on the 26th of February, 1869, at the early age of 33 years. He was elected a Fellow of our Society on the 6th of June, 1867.

Giuseppe Giacinto Moris was born at Orbessano on the 25th of April, 1796. He was brought up to the study of Medicine, for which he obtained the prize of the University of Turin in April 1815. In 1822 he went to Sardinia, having been appointed Professor of Clinical Medicine in the University of Cagliari. At that time the governor of Sardinia was desirous of meeting with a botanist to whom he could entrust the collection and description of the plants of Sardinia, and knowing Moris's botanical zeal, he engaged him to compile the Flora of Sardinia, associating with him as assistant Dr. Carlo Bertero, now well known from his voyage to the Antilles. When Bertero's health failed, Domenico Lisa, a young gardener, was appointed in his place, to whom Moris acknowledged himself to have been much indebted, and to whom he dedicated some of the new species of Sardinian plants.

Moris's journeys in Sardinia extended over about four years. They were carried on under considerable difficulties owing to the want of conveniences for travelling, and the unhealthiness of many of the localities. He made a rich collection of the plants of the island, which were at that time almost unknown to botanists. The two first fasciculi of the *Elenchus stirpium Sardoarum*, and the appendix to the second fasciculus, were published at Cagliari in 1827, and the third and last part was published at Turin in 1829. In this work Moris gave a Catalogue of all the species gathered by him in Sardinia, with indications of the habitats and times of flowering, and a summary of new and rare species. This work was the prelude to that to which he devoted almost his whole life, and which he spared no pains to make perfect. Not content with the great herbaria of Allioni, Balbis, Bertero, and others at the Botanic

Garden of Turin, he went to Paris and London, to examine, amongst others, the herbaria of Desfontaines and Linnæus, and he several times visited Florence, to consult the herbarium of the Museum of Physics and Natural History. He also cultivated Sardinian plants in the Botanic Garden at Turin, and thus rendered more exact the notes and descriptions he had made upon the spot. In this way he was enabled to publish the 1st vol. of his 'Flora Sardoa,' in 1837, the 2nd volume between the years 1840–43, and the 3rd volume in the years 1858–59. These volumes contain descriptions of the dicotyledonous plants, together with figures of the new or rare species, and form a profoundly scientific work, the first example, after the 'Herbarium Pedemontanum' of Colla, of a flora arranged according to the natural system.

Another important work, the 'Florula Caprariæ,' was written by Moris in conjunction with his pupil and friend Prof. de Notaris. In this work Moris availed himself of the plants collected by de Notaris and by Domenico Lisa in the summer of 1837, and of those brought from the island in the following year by Prof. Genè and Sign. Francesco Comba. The work comprises a catalogue of all the phænogamic and cryptogamic species found there, with figures and descriptions of some new species, such as *Centaurea gymnocarpa*, *Linaria Caprariæ* and others.

In his 'Stirpes novæ vel minus cognitæ' Dr. Moris described some new species of Sardinian plants, and he also gave an account of some plants found in Chili under the title of 'Plantæ Chilenses novæ minusve cognitæ.' He laboured zealously in the improvement of the Botanic Garden of Valentino, which he enriched with additional forcing-houses, with many new plants, and a beautiful Arboretum. He was not a contributor to our Journal or Transactions, but the Society is indebted to him for the copies of the 'Flora Sardoa' and the 'Florula Caprariæ' which are to be found in our Library.

He was elected a Foreign Member of our Society on the 5th of May, 1864, and died on the 18th of April, 1869, in the 73rd year of his age.

Charles Prideaux was born at Kingsbridge, in Devonshire, on the 2nd of January, 1782. During his youth and for a few years of his adult life he resided at Plymouth, but afterwards returned to his native place, Kingsbridge, where he continued until his death. He took great interest in pursuits connected with natural history; his collection of British Shells was an excellent one, and his persevering labours in dredging were the means of bringing to light rare and previously unknown specimens in marine zoology. The small

Hermit, or Soldier Crab, to which Dr. Leach gave the name of *Pagurus Prideauxi*, and which inhabits the sea on the southern coast of Devon, was named after Mr. Prideaux, by whose assistance, in sending a good series of specimens, Dr. Leach was enabled to ascertain that that species was distinct from *P. Streblonyx*. Mr. Prideaux observed it in a great variety of habitations, even in the tubes of the *Dentalia*, and in the shell of *Scaphander lignarius*. Dr. Leach continually refers to Mr. Prideaux as an indefatigable collector, and one of his most constant correspondents. Some years ago Mr. Prideaux presented to the Museum of the Plymouth Institution a very good collection of Crustacea, a large proportion, if not the whole, of them having been collected by himself, chiefly in Plymouth Sound, Bigbury Bay, and Kingsbridge Estuary. He always took a warm interest in everything connected with his native town, and a few years ago he presented his collection of stuffed birds and other curiosities to Kingsbridge, intending it to form the nucleus of a more general museum. Although confined to his bed for many years through illness and infirmity, his intellect remained bright to the last. He died at Kingsbridge on the 19th of July, 1869, in his 88th year. He was elected a Fellow of our Society on the 21st of December, 1813.

Johannes Evangelista Purkinje, Doctor of Medicine and Philosophy and Professor of Physiology in the University of Prague, was born at Libochovitz, in Bohemia, on the 17th of December, 1787. He was educated at the School of Libochovitz, and, after having had a course of instruction in music, he was sent as a chorister to Nicolsberg, in Moravia, where he entered the order "Patres piarum Scholarum," with the determination to devote himself exclusively to science and literature. After a novitiate of about a year, he was sent to Straźnic, in Hungary, as a teacher, where he occupied himself with the study of the Bohemian literature, paying great attention at the same time to the French and Italian languages. In 1806 he was a tutor in the normal school at Leitomischlin, in Bohemia, where he studied closely the German philosophy, especially that of Fichte. Thinking at that time that a cloister life was not well suited for attaining the position in science to which he felt he might aspire, he left the religious order and settled at Prague, where for some years he acted as a private tutor in different families, devoting himself also at the same time to the study of medicine. In 1818 he obtained the degree of Doctor of Medicine in the University of Prague, and became assistant in Anatomy and Physiology to the Professors Ilg and Rottenberger. He continued in that employment until the year

1822, when he was appointed Professor of Physiology at the University of Breslau, and shortly afterwards Professor of Medicine in the same University. This latter nomination caused great dissatisfaction amongst the professors and students at Breslau, who looked upon the appointment of an Austrian as an offence to themselves; but in the course of the next two years Purkinje, by the aid of his astonishing learning and his obliging and unassuming disposition, managed to overcome the prejudices of his colleagues, and to be on the best of terms with them. He remained in Breslau for many years, where, amongst his other labours, he exerted himself to establish a Physiological Institute, which he succeeded in doing in the year 1842. Previously to this time, however, in 1835, shortly after the death of his wife, he had become anxious to return to Prague, where he hoped to have become Professor either of Anatomy or Physiology. His long absence, however, was raised as an objection, and he failed at that time in obtaining either appointment. In 1848 he took part in the Slavic Assembly at Prague, on the occasion of the jubilee, or celebration of the five-hundredth anniversary, of the University, at which time he was nominated Doctor of Philosophy. He still felt a longing to spend his last years in the land of his birth,—a wish which was gratified by his appointment, in the summer of 1850, to the Chair of Physiology in the University of Prague. His first care was the efficient establishment of the Physiological Institute, then in its infancy. Afterwards he directed his attention to the encouragement of the advancement of natural science in the Bohemian language, of which the periodical entitled 'Živa,' which, from 1853 to 1864, was published under the superintendence of himself and Professor Krejčrs, affords ample proof; as also the 'Journal of the Bohemian Museum,' to which he contributed numerous articles. One of his later and most important inquiries was with reference to the effect of sound in the interior of the skull. By the use of certain instruments he came to the conclusion that the locus of this kind of hearing appeared to be situated in the hinder part of the skull. From observations at a deaf and dumb asylum, he found that almost all the patients had the capability of hearing through the medium of the skull. The newspapers thereupon circulated a report that Purkinje had made a discovery which would enable all deaf people to hear; and he was so overwhelmed with inquiries upon the subject, that he was obliged to send out a pamphlet, stating that his observations had not as yet advanced beyond the stage of theory.

In 1868 the fiftieth anniversary of his Doctor's degree was celebrated by his pupils and colleagues at Prague, and he received on

that occasion from the Emperor of Austria the Leopold decoration, which raised him to the rank of nobility—a promotion which he did not long survive. His death took place, after a short illness, on the 28th of July, 1869. It would be impossible, within the limits of this biographical notice, to give any adequate notion of the services rendered by Dr. Purkinje to science and literature, especially physiology.

A catalogue of his writings was published by the Bohemian Society of Physicians in 1868, and extends over 10 small quarto pages. The titles of more than 180 different works and papers are given in this catalogue. Fifty-five of these titles are in the Bohemian language, the others in German or Latin. Of the German and Latin works 24 relate to botany or zoology, the rest to physiology and a few other scientific and literary subjects.

Dr. Purkinje was elected a Foreign Member of our Society on the 6th of May, 1851.

John William Salter, A.L.S., F.G.S., was born on the 15th of December, 1820. After an education at a private boarding-school he was, in April 1835, bound apprentice to James de Carle Sowerby, with whom he was engaged in drawing and engraving the plates of Sowerby's 'Mineral Conchology,' then in progress towards completion, and also the plates of the 'Supplement to Sowerby's English Botany,' and of Loudon's 'Encyclopædia of Plants,' and of Murchison's 'Silurian System.' The figures for these and many other scientific works engraved by Mr. Salter at this time being all drawn from the actual specimens, helped, no doubt, materially to train his eye to that perfect knowledge of fossil forms which in later years rendered him so distinguished and keen a palæontologist. In 1842 he visited Cambridge, where he remained for a short time to assist Professor Sedgwick in arranging the fossils of the Woodwardian Museum. In the same year, at the age of 26, he entered upon the Geological Survey, and for eight years served as chief assistant to the palæontologist, Prof. Edward Forbes; Mr. Salter shared with Prof. Forbes in the arrangement, description, and cataloguing of the public fossil collections of the survey, and took part in the field-work and in all other duties. On the retirement of Edward Forbes, Prof. Huxley was appointed to the post of Naturalist to the Geological Survey, and Mr. Salter was installed in the office of Palæontologist. In consequence of the increasing extent of the labour of the Geological Surveyors the examination of the Irish fossils was, in 1856, handed over to Mr. W. Hellier Baily, and in the following year Mr. Robert Etheridge, having been appointed Assistant Naturalist to the Geological Survey, took charge of the fossils of the Se-

condary and Tertiary formations of Britain, thus leaving Mr. Salter free to devote his whole energies to his favourite work, the fossils of the palæozoic formations. During his period of office Mr. Salter prepared three Decades with 10 plates each (8vo size) on the Trilobites in the collection at Jermyn Street, and, in conjunction with Prof. Huxley, a Monograph on the genus *Pterygotus* illustrated with sixteen folio plates. He also completed a decade on the Echini commenced by Prof. Forbes, and supplied a part of the palæontology to Prof. Phillips's Memoir on Malvern. The palæontological portion of Prof. Ramsay's Memoirs on North Wales was also written by Mr. Salter. More than thirty papers by Mr. Salter on various geological topics are to be found in the Journal of the Geological Society; and he also wrote in the Annals and Magazine of Natural History, the Geological Magazine, and other Journals. Four parts of a Memoir on British Trilobites, illustrated by thirty 4to plates and containing 216 pages of text, have been published by the Palæontographical Society. In Murchison's 'Siluria' and Lyell's 'Manual' Mr. Salter's services are apparent and acknowledged. He also described fossils from the Himalayas, Australia, China, South Africa, Canada, Oregon, and other places. He projected and, conjointly with Mr. Henry Woodward, prepared a tabular view of British Fossil Crustacea, showing their range in time, which was engraved and published by M. J. W. Lowry in 1865; and, but for the great expense attending the engraving, several other groups were also intended to be tabulated. After his retirement from the office of Palæontologist to the Geological Survey in 1863, he was engaged at various times arranging and naming the Palæozoic Invertebrata of the Manchester, Leicester, Leeds, Worcester, Malvern, Taunton, and Cambridge Museum collections, and he also executed numerous plates and woodcuts. A catalogue, illustrated by himself, of the Cambrian and Silurian Fossils in the Woodwardian Museum was one of the last tasks which he undertook. It remains uncompleted, as does his Monograph on the Trilobites.

Mr. Salter died on the 2nd of August, 1869, having been elected an Associate of our Society on the 15th of November 1842.

Professor Michael Sars, of Christiania.—This eminent zoologist was born on the 30th of August, 1805, at Bergen, where his father was a ship-owner. After finishing his academical studies at Christiania, and evincing at an early age his predilection for natural science, he entered into priest's orders, and in 1830 became pastor at Kinn, in the diocese of Bergen. Ten years afterwards he had charge of the parish of Manger in the same diocese. As both these parishes were on the sea-coast, Sars had constant opportunities of pursuing his

zoological researches. In 1829 he published his first essay, entitled "Bidrag til Söedyrenes Natur-historie," and in 1846 the first part of his celebrated work 'Fauna littoralis Norvegiæ.' In 1854 he was appointed Professor Extraordinarius of Zoology at the University of Christiania, a position which he filled up to the time of his lamented death with great honour to his country, and to the satisfaction of the whole world of science. His celebrity as a zoologist, as well as a palæontologist, was fully recognized by all naturalists and geologists, and he was elected a member of several foreign scientific societies. Our own distinguished countryman, the late Edward Forbes, individually showed his appreciation of Sars's labours in eloquent pages (66 and 67) of his own posthumous work, 'The Natural History of the European Seas,' when he said, "More complete or more valuable zoological researches than those of Sars have rarely been contributed to the science of Natural History, and the success with which he has prosecuted investigations claiming not only a high systematic value, but also a deep physiological import, is a wonderful evidence of the abundance of intellectual resources which genius can develope, however secluded and wherever its lot be cast;" and he added that the name of this Norwegian priest "(who reaped reputation when seeking no more than knowledge), familiar to every naturalist in Europe and America, in Asia, and at the Antipodes (for there are great naturalists settled far in the south, and many in the far east), is a sufficient proof that able work brings the rewards of applause and veneration, even when they be unasked for." By the observations of Sars on the development of the Medusæ he greatly advanced our knowledge of that remarkable physiological phenomenon known as the alternation of generations, which Chamisso had first indicated in the Salpæ. His last publication, 'Mémoire pour servir à la connaissance des Crinoïdes vivants,' caused especial interest, by showing that a race of animals, supposed to be extinct for a period so long as only to be measured by the duration of several past geological epochs, occurred in a living state in the abysses of the Norwegian seas. This discovery mainly induced the recent exploration of our own seas at great depths, which has produced such wonderful results; and the living Crinoid, or "stone-lily" (*Rhizocrinus Lofotensis*), has now been ascertained to inhabit many parts of the Atlantic from the Loffoden Isles to the Gulf of Mexico. The published works of Sars are seventy-four, and they are not less sound and valuable than numerous. One of his sons, Dr. George Ossian Sars, inherits the zoological inclinations

and talent of the late Professor, and is second to none in the knowledge of the Sessile-eyed Crustacea.

He was elected a Foreign Member of our Society on the 3rd of May, 1860, and died on the 22nd of October, 1869. His loss will be much regretted by all naturalists, and especially by those who have benefited by his long, laborious, and conscientious investigation of the invertebrate fauna of the Norwegian seas.

Captain Charles Sturt, "the Father of Australian Exploration," as he has been called, was born in India in 1796, and was the eldest son of Thomas Napier Lennox Sturt, of the B.C.S. Capt. Sturt was educated at Harrow, and on leaving that school obtained a commission in the 39th regiment. After seeing some hard service in America and Ireland, he accompanied his regiment in 1827 to New South Wales, where, at head-quarters at Sydney, he was shortly after his arrival appointed Brigade-Major. At that time much discussion was taking place in Sydney respecting the physical geography of Australia, of which little or nothing was then known. Capt. Sturt took a keen interest in the debate, and became a partisan of the "Great Central Lake" theory. The map of the island continent at that period was little more than the bare outline of the coast; and even in this outline there were huge gaps representing hundreds of miles. Oxley alone had gone far inland; and his researches had only shown him that the one considerable stream known to exist dwindled away, growing shallower and shallower, until it fairly spread out and lost itself under enormous reeds in a desolate marsh. Oxley, however, had journeyed in a wet season, and Capt. Sturt thought it might be worth while to try the experiment again in a time of drought. He soon had a chance of carrying his plan into execution. For two years the drought was excessive: to use his own words, "The surface of the earth became so parched up that minor vegetation ceased upon it. Culinary herbs were raised with difficulty, and crops failed even in the most favourable situations. Settlers drove their flocks and herds to distant tracts for pasture and water. The interior suffered equally with the coast, and men at length began to despond under so alarming a visitation. It almost appeared as if the Australian sky were never again to be traversed by a cloud." In November 1828 Capt. Sturt started on his first expedition with a friend, a couple of soldiers, and six convicts. After tracing the Macquarrie to its swamp, they journeyed, and began to suffer bitterly from want of water. They toiled along over the parched soil feverish with thirst, when they perceived a

broad river in the distance, which Capt. Sturt thus describes :—" Its banks," he says, " were too precipitous to allow of our watering the cattle; but the men eagerly descended to quench their thirst, which a powerful sun had contributed to increase; nor shall I ever forget the cry of amazement that followed their doing so, or the look of terror and disappointment with which they called out to inform me that the water was so salt as to be unfit to drink." Thus was the river Darling discovered in 1829. Capt. Sturt had explored 1300 miles of unknown country, the bulk of which is now used for pasture or tillage; and in the following year he set out upon a still more memorable journey. Leaving Sydney in September 1829, he followed the course of the Murrumbidgee, a deep and rapid stream, widely different in its character from the Lachlan or the Macquarrie. The natives whom they met upon their way assured them that they would find a still larger river further on, flowing from south-east; and yet soon after receiving this encouragement they found the stream becoming shallow, and the marsh reeds made their appearance. Every day the difficulties increased, and it was plain that they would have to leave their cattle and heavy baggage behind. A depôt was formed, and the drags and cattle were sent back. Capt. Sturt put together a whaleboat and embarked with a friend (Mr. George McLeay) and six men. A skiff containing their provisions was in tow; but before long it was upset, and many of the stores were lost. Snags impeded the navigation, and more than once the wreck of the boat seemed inevitable. Being confident that they were on the right track, Capt. Sturt held on until one day the look-out man exclaimed that they were approaching another stream, and in a few minutes more their boat was swept into the main current of the River Murray, following which they soon reached another river, which Capt. Sturt at once declared to be the Darling, a theory long disputed, but which ultimately proved correct. They went on until the Murray poured itself into the great salt expanse which Capt. Sturt called Lake Alexandrina, within sight and sound of the sea. A great geographical problem had been solved, and a noble service rendered to England. The return journey against the rapid current of the stream was terrible work for the whole party. Capt. Sturt suffered severely in both these expeditions, so much so that when he published his book in 1833 he was almost blind; but his passion for exploring continued, and after being employed for some years as Colonial Surveyor for South Australia, he matured another plan for an inland journey, this time towards the very centre of the continent, and set out in September of 1844. There has seldom

been a more unfortunate expedition. The plan was good; his followers were eminently fit for the work; and yet it resulted in misery and failure. As it happened the party just hit upon the worst part of the whole land. Often by going a few miles out of their course they might have got into more fertile country, but though they spared no toil and feared no danger, some fatality seemed to attend them. The hardships they endured were horrible. The second in command, Mr. Poole, sank rapidly and died of black scurvy, but Capt. Sturt, whose activity was indefatigable, persevered and discovered Cooper's Creek. At last, to save his life, he was compelled to turn back. He reached one of his depôts, but only to find it deserted. Ultimately he arrived at Adelaide in safety, but he was blind, and to the end of his life he never quite recovered his eyesight. On leaving the army, after a short residence in the interior of New South Wales, he passed into the neighbouring colony of South Australia, where, as its discoverer, he was received with the most marked respect, and where he continued to reside for about fifteen years, holding successively the offices of Assistant-Commissioner, Registrar-General, Treasurer, and Colonial Secretary. In 1853 he retired on a pension, and on his return to England went to live at Cheltenham, where he died on the 16th of June, 1869. If he had lived for another month it is understood that he was to have been included in the list of Knights Commanders of the Order, then just resuscitated, of St. Michael and St. George, a too tardy recognition of the great services for which England is so largely indebted to him. Capt. Sturt published valuable narratives of his three great expeditions. His account affords much interesting matter in different branches of natural history. We are indebted to him for the discovery of many of the most beautiful and interesting birds of Australia, one of which, *Plyctolophus Leadbeateri*, is perhaps the handsomest of the Parrot tribe to be found in our aviaries. He gave also to our conservatories the beautiful *Clianthus Dampieri*, which has been called "Sturt's Pea." Capt. Sturt was elected a Fellow of our Society on the 16th of April, 1833.

Franz Joseph Andreas Nicholaus Unger was born on the 30th of November, 1800, at Leitschach, in Styria. After the completion of his early education, he commenced the study of the law, at the same time devoting some attention to natural history. After about a year he abandoned the law and went to the University of Vienna, to study medicine. In 1822 he left Vienna, and went for a short time to Prague, where he studied physiology and chemistry. In the following year, after travelling for some time in Germany, he returned

to Vienna to finish his medical studies; but having incurred the suspicion of the Government, apparently on account of what would now be called "liberal principles," he was thrown into prison, and although after some months the severity of his confinement was relaxed, he did not entirely regain his liberty until July 1825. During his imprisonment he devoted much time to studies of various kinds, including botany, having been allowed occasionally, in charge of an officer, to visit the Prater and the Botanic Garden. In 1827 he graduated as a Doctor of Medicine, and practised his profession until 1833, at Stockerau, near Vienna. In 1830 he went to reside at Kitzbühel, in the Tyrol, where he had obtained an official medical appointment. Here he remained for about five years, when, upon the death of Heyne, he was appointed to the chair of Botany at Joanneum in Graz, which he held for nearly 15 years. At the death of Endlicher, a chair of physical botany was established at Vienna. It was offered to and accepted by Unger, who left Graz in the winter of 1849 and entered upon his professional duties at Vienna, which he performed for sixteen years. In 1866, to the great regret of his pupils and scientific friends, he resigned the Vienna professorship, and retired to Graz, where he continued to reside until his death in February of the present year. Dr. Unger's literary and scientific activity is testified by a catalogue of the works and papers published by him from time to time *, and which, exclusive of minor contributions to periodicals, exceed 150 in number. It may be interesting to mention a few of the most important of his writings. In 1827 his observations upon the development of the Zoospores of *Vaucheria clavata* were published by the Academy of Vienna; the 'Exantheme der Planzen' was published in 1833, the 'Aphorismen zur Anatomie und Physiologie der Pflanzen' in 1838; the 'Chloris protogæa' in 1841; the 'Grundzüge der Botanik' in 1843; the 'Grundzüge der Anatomie und Physiologie der Pflanzen' in 1846; the 'Genera et Species Plantarum Fossilium' in 1850; the 'Urwelt in verschiedenen Bildungsperioden' in 1851; the 'Anatomie und Physiologie der Pflanzen' in 1855; the 'Wissenschaftliche Ergebnisse einer Reise in Griechenland und den Ionischen Inseln' in 1862. In January of the present year he communicated to the Academy of Vienna a paper on the primeval *Typhaceæ*, and a few weeks before his death he finished the second part of his 'Geologie der Europaischen Waldbäume,' in which he attempts to trace back the existing Coniferæ to their primitive form in the Tertiary period.

Dr. Unger's death was melancholy and mysterious. He had been

* See Botanische Zeitung of April 22nd, 1870.

suffering for some time from sciatica and chronic rheumatism, and in February of the present year he caught a cold, which laid him up for several days. It was thought he had nearly recovered from the attack when, on the morning of Sunday, the 13th of February, he was found dead in his bed. There were several slight wounds on his head, besides other injuries on the body, and there were traces of blood about the bed. A judicial inquiry was held, but no light was thrown upon the cause of death; and whether it was the result of accident or violence is not, and probably never will be, known.

Dr. Unger was elected a Foreign Member of our Society on the 4th of May, 1852.

James Veitch was born on the 24th of May, 1815, in the neighbourhood of Exeter, where his grandfather and his father were at that time carrying on the business of nurserymen. When about eighteen years of age he was sent to London for two years for the purpose of acquiring experience in a London establishment. One year of this period was passed in the nursery of Mr. Chandler, of Vauxhall, and the other in that of Messrs. Rollisson, of Tooting. Returning again to Exeter, he devoted his energies to the gradual extension and improvement of the establishment at Mount Radford, making it eventually one of the first nurseries of the day; and as a partner in the firm of James Veitch and Son, and subsequently, on the death of his father, as the head of that of James Veitch and Sons, he raised himself to one of the very foremost positions in that line of business. In 1853, while still a partner in the nursery at Exeter, Mr. James Veitch removed to London, and took possession of the establishment at Chelsea, which formerly belonged to Messrs. Knight and Perry. To show how far our gardens are indebted to the labours of Mr. Veitch, it would be necessary to write a history of very many of the new plants introduced during the last 30 years. To his active superintendence of their importation and to his discriminative choice of collectors, may be largely attributed the success which was realized in this department. The later explorations of Pearce, Hutton, and others, by which many fine plants were acquired, were directly under his control; to the results of the foregoing must be added those of the two journeys of his eldest son, Mr. John Gould Veitch, to Japan and the South Pacific, which proved so prolific of novelties. In addition to the esteem in which he was held as an introducer and distributor of plants, Mr. Veitch also occupied an eminent position as a cultivator and exhibitor, especially of Heaths and Orchids. For several years, from 1856 to 1864, Mr. Veitch was a member of the Council of the Royal Horti-

cultural Society, and took an active part in the administration of its affairs. The idea of the Fruit and Floral Committees of the Royal Horticultural Society originated with Mr. Veitch, and a scheme was drawn by him and others, which was virtually that adopted by the Council, and which has not only worked well but has essentially benefited the Society. About two years ago, owing to premonitory symptoms of heart-disease, Mr. Veitch ceased to take so active a part as formerly, either in horticultural affairs or in matters of business; but latterly he had been in better health than usual, so that his death, although under the circumstances not wholly unexpected, took place more suddenly than had been anticipated. He died at Stanley House, Chelsea, on the 10th of September, 1869, at the age of 54. He was elected a Fellow of our Society on the 6th of December, 1866.

June 2nd, 1870.

George Bentham, Esq., President, in the Chair.

The Rev. T. A. Marshall, M.A., was elected a Fellow.

The President nominated J. J. Bennett, Esq., George Busk, Esq., J. D. Hooker, M.D., and W. W. Saunders, Esq., Vice-Presidents for the ensuing year.

Mr. Bell exhibited a flowering specimen of the wild Tulip (*Tulipa sylvestris*, L.), of which a patch about three feet diameter occurs in the Park at Selborne, Hants. In a note to the Librarian, which accompanied the specimen, Mr. Bell states that the plant is undoubtedly wild there, and that it also occurs in two other localities within a few miles of Selborne, viz. at Froyle, and near Theddon Grange, Alton.

Mr. Hanbury, F.L.S., exhibited the dried fruits of two species of *Zizyphus*, collected by the European residents in China, *Red* and *Black Dates*. These fruits are used by the Chinese as articles of food, and are exported in vast quantities from the city of Che Foo. The "Red Dates" appear to be identical with the *Jujubes* of the South of Europe.

The following papers were read:—

1. "On some new forms of Extra-European Trichopterous Insects," by Robert MacLachlan, Esq., F.L.S.

2. "New Lichens, recently discovered in Great Britain," by the Rev. James M. Crombie, M.A., F.L.S., &c.

June 16th, 1870.

George Bentham, Esq., President, in the Chair.

Frank Crisp, Esq., LL.B., and John Clavell Mansel, Esq., were elected Fellows.

The following papers were read :—

1. "Petalody of the Sepals in *Serapias*," by John Traherne Moggridge, Esq., F.L.S.

2. "Notes on the Reptiles, Amphibia, Fish, Mollusca, and Crustacea, obtained during the voyage of H.M.S. 'Nassau,' in the years 1866–69," by Robert O. Cunningham, M.D., F.L.S., C.M.Z.S.

3. "Memoir on the Spermogones and Pycnides of Crustaceous Lichens," by W. L. Lindsay, M.D., F.L.S.

4. "The Fungi of Ceylon (Hymenomycetes)," by the Rev. M. J. Berkeley, M.A., F.L.S., and C. E. Broome, Esq., F.L.S.

5. "Notes on *Gerania*," by F. P. Balkwill, Esq., F.L.S.

ERRATA.

It is requested that the following errors in the preceding pages be corrected.

Page lii. *Transfer to the head of* ENTOMOLOGY *the article* V. Graber. On the Proventriculus *&c.* of Grasshoppers, *entered by mistake under* CRYPTOGAMIC BOTANY, p. lxvii.

Page lxxiii, line 4 from the bottom, *for* Proc. R. Soc. xviii., *read* Presented by the author.

Page lxxxii, line 23, *omit the words* no specimens, indeed, of the whole Order.

INDEX TO THE PROCEEDINGS.

SESSION 1869–1870.

PROCEEDINGS

OF THE

LINNEAN SOCIETY OF LONDON.

(SESSION 1870-71.)

November 3rd, 1870.

George Bentham, Esq., President, in the Chair.

The Rev. Samuel Mateer was elected a Fellow.

The following Report, on the Additions to the Library since the last Report (Proceedings, 1869-70, p. xxxvii), was laid before the meeting:—

The Publications of Scientific Bodies received since the date of the last Report (May 5th, 1870) have been the following:—

Denmark:—

Royal Danish Society of Science, Copenhagen. Transactions (Skrifter), Ser. 5, viii. parts 3 to 7, ix. part 1; Proceedings (Oversigt over Forhandlinger), 1868, n. 5, 6, 1869, n. 3, 4, 1870, n. 1.

Sweden:—

Royal Academy of Sciences, Stockholm. Voyage of the Frigate 'Eugénie:' Hymenoptera.

RUSSIA :—

Imperial Academy of Sciences, St. Petersburg. Memoirs, Ser. 7, xiv. parts 8, 9, xv. parts 1 to 8; Bulletin, xiv. n. 4 to 6, xv. n. 1, 2.

Entomological Society of Russia, St. Petersburg. Horæ, vi. n. 4.

Imperial Society of Naturalists, Moscow. Bulletin, 1869, i. n. 1, 2, ii. n. 3, 4.

University of Kazan. Proceedings and Scientific Papers or Memoirs (Izvestia i Utchenia Zapiski), 1865–69.

GERMANY :—

Royal Academy of Sciences, Berlin. Proceedings (Monatsberichte), 1870, February to May.

Imperial Academy of Sciences, Vienna. Transactions (Denkschriften), xxix. Proceedings (Sitzungsberichte), Physical Division, lix. n. 4, 5, lx. n. 1, 2; Natural-History Division, lix. n. 3 to 5, lx. n. 1, 2. Minutes of Meetings (Anzeiger), 1870.

Imperial and Royal Geological Institute of Vienna. Transactions (Abhandlungen), iv. n. 9, 10; Journal (Jahrbuch), xix. n. 2, xx. n. 1; Proceedings (Verhandlungen), 1869, n. 6 to 9, 1870, n. 1 to 5.

Royal Bavarian Academy of Sciences, Munich. Proceedings (Sitzungsberichte), 1869, ii. n. 3, 4; 1870, i. n. 1 to 3.

Natural History Society of Bremen. Transactions (Abhandlungen), ii. part 2.

Physico-economical Society of Königsberg. Memoirs (Schriften), viii. to x. (1867–69).

Natural History Society of Hanover. Proceedings (Jahresberichte), 1867–69.

Natural-History Society of Rhenish Prussia, Bonn. Transactions (Verhandlungen), xxvi.

Nassau Society for Natural Sciences, Wiesbaden. Journal (Jahrbücher), xxi., xxii.

Natural-History Society of Brünn. Transactions (Verhandlungen), vii.

DUTCH NETHERLANDS :—

Dutch Society of Sciences, Haarlem. Archives Néerlandaises, v. n. 1 to 3.

Netherlands Entomological Society, The Hague. Journal of Entomology, Index to the first series of eight years; 2nd ser., iv. parts 3 to 6, v. parts 1, 2.

Society for the Flora of the Netherlands and their transmarine possessions. Minutes of the Anniversary meetings, 1862–67.

BELGIUM :—

Royal Academy of Sciences, Brussels. Mémoires couronnés, 4to, xxxiv.; 8vo, xxi. Bulletin, xxvii., xxviii.; Annuaire, 1870. Periodical Phenomena, 1867–68.

Royal Botanical Society of Belgium, Brussels. Bulletin, viii. n. 3, ix. n. 1.

FRANCE :—

Botanical Society of France. Bulletin, xvii.; Comptes Rendus, n. 1; Revue Bibliographique, B.

Entomological Society of France. Annals, Ser. 4, ix. parts 2 to 4.

Society of Natural Sciences, Strasbourg. Memoirs, vi. part 2; Bulletin, 1869.

Imperial Society of Natural Sciences, Cherbourg. Memoirs, xiv.

ASIA :—

Society of Arts and Sciences, Batavia. Transactions (Verhandelingen), xxxiii.; Journal (Tijdschrift), xvi. parts 2 to 6, xvii., xviii. part 1; Proceedings (Notulen), iv. part 2, v., vi., vii. part 1; Catalogues of the Numismatical and Ethnological portions of their Museum.

Royal Natural-History Society of Dutch India, Batavia. Natural-History Journal of Dutch India (Tijdschrift), xxxi. 1 to 3.

Asiatic Society of Bengal, Calcutta. Journal, Ser. 2, xxxix. (1870); History &c., parts 1, 2; Physical Science, parts 1, 2.

Indian Government. Forest-Reports for British Burmah, 1867–68; for the province of Oudh, 1868–69.

AUSTRALIA :—

Entomological Society of New South Wales, Sydney. Transactions, i. part 5.

Adelaide Philosophical Society. Annual Report and Transactions, 1870.

SOUTH AMERICA :—

Public Museum of Buenos Ayres. Annals, ii. part 1.

Society of Physical and Natural Sciences, Caraccas. Vargasia, n. 7.

North America :—

Smithsonian Institute, Washington. Contributions to Knowledge, xvi.; Miscellaneous Collections, viii., ix.; Annual Report and Proceedings of Board of Regents for 1868.

Academy of Natural Sciences, Philadelphia. Proceedings, 1869, parts 3, 4; American Journal of Conchology, v. parts 3, 4.

American Philosophical Society, Philadelphia. Proceedings, xi. n. 82.

American Academy of Arts and Sciences, Boston. Proceedings, viii.

Boston Society of Natural History. Proceedings, xii., xiii.

Lyceum of Natural History, New York. Annals, ix.

American Museum of Natural History, New York. First Annual Report.

Essex Institute, Salem. Act of Incorporation, Historical Notice; Bulletin, i. (1869); Proceedings, vi. part 1; Annual Report of the Trustees of the Peabody Academy of Science, 1869; American Naturalist, iii., iv. n. 1, 2.

Portland Society of Natural History. Reports of the Commissioners of Fisheries of the State of Maine, 1867–69.

Chicago Academy of Sciences. Transactions, i. part 2.

British Dominion :—

Natural-History Society of Montreal. Canadian Naturalist, v. part 1.

Great Britain and Ireland :—

Royal Society. Philosophical Transactions, clx. part 1; Proceedings, xviii. n. 119 to 122.

Clinical Society. Transactions, iii.

Geological Society. Quarterly Journal, xxvi. parts 2, 3.

Linnean Society. Transactions, xxvii. part 2. Journal, Zoology, x. n. 48, xi. n. 49; Botany, xi. n. 53 to 55.

Medical and Chirurgical Society. Proceedings, vi. n. 6.

Quekett Microscopical Club. Fifth Report; Journal, ii. n. 11, 12.

Royal Agricultural Society. Journal, Ser. 2, vi. part 2.

Royal Geographical Society. Proceedings, xiv. n. 2 to 4.

Royal Institution. Proceedings, v. n. 7, vi. n. 1, 2.

Royal Microscopical Society. Monthly Microscopical Journal to Nov. 1870.

Royal Irish Academy. Transactions, xxiv.; Science, parts 9 to 14; Antiquities, part 8; Literature, part 4.

Royal Dublin Society. Journal, v. n. 39.

Bath Natural-History and Antiquarian Field-Club. Proceedings, ii. part 1.

Royal Cornwall Polytechnic Society. 37th Annual Report.

Leeds Philosophical and Literary Society. Annual Report, 1869–70.

Norfolk and Norwich Naturalists' Society. Transactions, 1869–70.

Natural-History Transactions of Northumberland and Durham, iii. part 2.

Plymouth Institution, and Devon and Cornwall Natural-History Society. Transactions, iv. part 1.

The Scientific Periodicals taken in by, or presented to, the Society are the same as those enumerated in last year's Reports (Proceedings, p. v), with the exception of 'The Entomologist,' and with the following additions:—

Kröyer's Naturhistorisk Tidsskrift, continued by Prof. Schiödte, Presented by Prof. Schiödte (from the commencement of Ser. 3).

Nuovo Giornale Botanico Italiano. Presented by the Editor.

Nature, weekly. Presented by the Publishers.

The following back parts of Transactions and Journals have been purchased:—

Imperial Society of Naturalists of Moscow. Nouveaux Mémoires, ii., or viii. of the whole series (1832).

Annales des Sciences Naturelles, Paris, Ser. 1, i. to ix. (1824–26), completing our set.

Adansonia, Paris, 8vo, edited by H. Baillon, i. to viii. (1860–68).

The Biological Papers contained in the above Transactions, Proceedings, and Journals (excepting old volumes or parts analysed in the Royal Society's Index), and the separate works added to the Library since the last Report, are as follows:—

(This analytical enumeration is continued according to the plan adopted last year, and explained in Proceedings, p. vi.)

Mammalia and General Zoology:—

A. Agassiz. Notes on Beaver-Dams. Proc. Bost. Soc. Nat. Hist. xiii.

J. A. Allen. Notes on the Mammals of Iowa. Proc. Bost. Soc. Nat. Hist. xiii.

W. Andrews. On *Ziphius Sowerbyi*, 1 plate. Trans. R. Irish Acad. xxiv.

P. J. van Beneden. On the *Balænoptera* of the Northern Atlantic. Bull. Acad. Sc. Brussels, xxvii.—On commensalism in the animal kingdom. Ibid. xxviii.

E. v. Beneden. Researches on the composition and signification of the Egg, 10 plates. Mém. cour. Acad. Sc. Bruss. 4to, xxxiv.

J. D. Cator. Popular Mammalogical Papers in Amer. Naturalist, iii.

E. Coues. Observations on the Marsh Hare.—Notice of a cyclopean Pig. Proc. Bost. Soc. Nat. Hist. xiii.

J. Dean. The grey substance of the medulla oblongata and trapezium, human and mammalian, 16 plates and woodcuts. Smithson. Contrib. xvi.

D. F. Eschricht. Nine plates illustrating the structure of Cetacea, posthumous publication by J. Reinhardt. Trans. R. Dan. Soc. Sc. ix.

L. J. Fitzinger. The natural family of Moles, their characters and critical remarks.—Revision of the natural family of Cats.—Revision of the natural family of Cladobata. Proc. Imp. Acad. Sc. Vienna, lix. & lx.

A. Friedlowsky. On malformations in the teeth of Mammalia, 1 plate. Proc. Imp. Acad. Sc. Vienna, lix.

J. E. Gray. On the skull of *Balæna marginata*.—Note on the species of Wart-Hog (*Phacochœrus*).—On the Whales described in the Ostéographie des Cetacés of Van Beneden and Gervais.—The geographical distribution of the Cetacea.—Notice of the Falanaka of Madagascar. Ann. Nat. Hist. Ser. 4, vi.

J. Haast. Preliminary notice of a ziphioid Whale stranded on the coast of New Zealand (from Proc. Phil. Inst. Canterb. no. 2). Ann. Nat. Hist. Ser. 4, vi.

F. V. Hayden. A new Hare from the Wind-River Mountains. Amer. Naturalist, iii.

W. J. Hays. The Mule Deer, 1 plate. Amer. Naturalist, iii.

C. K. Hoffmann and H. Weijenbergh, jun. On the place of *Chiromys* in the natural method. Arch. Néerland. v.

R. J. Lee. On the organs of vision in the common Mole. Proc. R. Soc. xviii.

— Masius and — Vaulair. Experimental researches on the anatomical and functional regeneration of the spinal marrow, 2 plates. Mém. cour. Acad. Sc. Bruss. 8vo, xxi.

W. Peters. The Cheiroptera of Sarawak. Nat. Tijdschr. Ned. Ind. xxxi.

R. A. Philippi. On *Felis colocolo*, Molina, ½ plate.—On a supposed new Stag from Chili. Wiegm. Archiv, xxxvi.

L. Sabaneef. Preliminary sketch of the vertebrate fauna of the central Oural. Bull. Soc. Imp. Nat. Mosc. 1869.

C. M. Scannon. On Sea-Otters. Amer. Naturalist, iv.

P. L. Sclater. Note on Ælian's Wart-Hog. Ann. Nat. Hist. Ser. 4, vi.

L. Stieda. On the central nervous system in Vertebrata, 4 plates. Zeitschr. wissensch. Zool. xx.

Ornithology:—

J. Borsenkow. On the development of the egg in the Fowl, 2 plates. Bull. Soc. Imp. Nat. Mosc. 1869.

J. F. Brandt. Observations on *Alcidæ*. Bull. Imp. Acad. Sc. Petersb. xiv.

E. Coues. On variation in the genus *Ægiothus*.—On the classification of Water-Birds. Proc. Acad. Nat. Sc. Philad. 1869.—Ornithological Notes. Amer. Naturalist, iii.—On a chick with supernumerary legs. Proc. Bost. Soc. Nat. Hist. xiii.

W. H. Dall and H. M. Bannister. List of the Birds of Alaska, with notes and descriptions. Trans. Chicago Acad. Sc. i.

S. R. Dole. Synopsis of the Birds hitherto described from the Hawaian Islands. Proc. Bost. Soc. Nat. Hist. xii.

D. G. Elliot. A new Pheasant from China.—A new Humming-bird of the genus *Chrysolampis*. Ann. Nat. Hist. Ser. 4, vi.

W. E. Endicott. Popular Ornithological Papers. Amer. Naturalist, iii.

A. Ernst. Contributions to the ornithological fauna of Venezuela, 1 plate. Vargasia, n. 7.

E. A. Eversmann. Natural history of the Birds of the Orenbourg district. Mem. Univ. Kazan, 1866 to 1868, forming a separate volume, 8vo, 621 pages.

J. C. H. Fischer. Short Ornithological papers. Kröyer's Tidsskr. Ser. 3, iii.

A. Fowler. Popular Ornithological papers. Amer. Naturalist, iii.

— Godwin-Austen. List of Birds obtained in the Khasi and North Cachar hills. Journ. Asiat. Soc. Bengal, xxxix.

J. Gould. A new species of *Seisura*. Ann. Nat. Hist. Ser. 4, vi.

A. v. Homeyer. Remarks on A. Römer's list of the Birds of Nassau. Journ. Nassau Naturh. Ver. xxii.

A. O. Hume. Additional notes on Indian birds noticed by Mr. Blanford. Journ. Asiat. Soc. Bengal, xxxix.

G. Jæger. On conditions of growth exemplified in Birds, woodcut. Zeitschr. wissensch. Zool. xx.

H. Jouan. On the Jabirú of Australia.—On the fauna of New Zealand, chiefly birds. Mém. Soc. Imp. Sc. Nat. Cherbourg, xiv.

G. N. Lawrence. List of a collection of Birds from northern Yucatan.—List of Birds from Puna Island, Gulf of Guayaquil.—Characters of new South-American Birds. Ann. Lyc. Nat. Hist. N. York, ix.

T. H. Potts. Notes on the breeding-habits of New-Zealand Birds, 3 plates. Presented by the Author.

H. Reeks. Notes on the Birds of Newfoundland. Canad. Naturalist, v.

A. Schwab. The Avifauna of Mistek and its neighbourhood. Trans. Nat. Hist. Soc. Brünn, vii.

E. Selenka. On the morphology of the muscles of the shoulder in Birds. Archiv. Néerl. v.

R. B. Sharpe. On a collection of Birds from China and Japan. Ann. Nat. Hist. Ser. 4, vi.

H. Stevenson. The Birds of Norfolk, vol. 2. Presented by the Author.

R. Swinhoe. Four new Birds from China. Ann. Nat. Hist. Ser. 4, vi.

Viscount Walden. New Birds from Southern Asia. Ann. Nat. Hist. Ser. 4, v.

Ibis, vi. n. 23.

ICHTHYOLOGY:—

C. C. Abbott. Freshwater Fishes of New Jersey. Amer. Naturalist, iii.

— Baudelot. On the comparative anatomy of the encephalum of Fishes, 2 plates. Mém. Soc. Sc. Nat. Strasb. vi.—On the texture of the anterior lobes of the Stickleback, examined in ordinary and in distilled water. Bull. Soc. Sc. Nat. Strasb. 1869.

A. Fée. On the lateral system of the pneumo-gastric nerve of Fishes, 4 plates. Mém. Soc. Sc. Nat. Strasb. vi.

— Guichenot. Revision of the genera *Pagellus*, *Lithognathus*, and *Calamus*. Mém. Soc. Imp. Sc. Nat. Cherbourg, xiv.

R. Hensel. On the Vertebrata of S. Brazil: Fishes of the province of Rio Grande do Sul. Wiegm. Archiv, xxxvi.

J. Hyrtl. On the blood-vessels of the outer opercula of the branchiæ of *Polypterus Lapradei*, Steind., 1 plate. Proc. Imp. Acad. Sc. Vienna, lx.

S. Legouis. On the pancreas of osseous Fishes (from the Comptes Rendus). Ann. Nat. Hist. Ser. 4, v.

F. Poey. Review of the Fishes of Cuba belonging to the genus *Trisotropis*.—Notes on the hermaphroditism of Fishes. Ann. Lyc. Nat. Hist. N. York, ix.

J. C. Schiödte. On the development and position of the eye in Flat-fish, 1 plate. Kröy. Tidsskr. v.

F. Steindachner. *Polypterus Lapradei* and *P. senegalus* from Senegal, 2 plates.—Ichthyological notes, 2 papers, 15 plates. Proc. Imp. Acad. Sc. Vienna, lx.

W. Wood. Ichthyological notes. Amer. Naturalist, iii.

Reports of the Commissioners of Fisheries for the State of Maine, 1867, 1868, 1869. Presented by the Portland Soc. Nat. Hist.

Reptiles and Batrachia :—

D. van Bembeke. On the development of *Pelobates fuscus*, 5 plates. Mém. couronn. R. Acad. Sc. Brussels, 4to, xxxiv.

A. Preudhomme de Borre. On a young *Dermatemys Mawii*.—On a new American Alligator, 1 plate. Bull. Acad. Sc. Brussels, xxviii.

E. D. Cope. Seventh contribution to the Herpetology of Tropical America, 3 plates. Proc. Amer. Phil. Soc. Philadelphia, xi.

J. E. Gray. *Phelsuma grandis*, a new Night-Lizard from Madagascar.—*Testudo chilensis*, a new Chilian Tortoise. Ann. Nat Hist. Ser. 4, vi.

A. B. Meyer. On the venom-apparatus of Snakes, more especially of *Callophis intestinalis* and *virgatus*. Nat. Tijdschr. Ned. Ind. xxxi., and Wiegm. Archiv, xxxv.

W. C. H. Peters. On the African Monitors.—Contributions to the Herpetological fauna of S. Africa, 1 plate.—On *Platemys tuberosa*, a new Tortoise from British Guiana. Proc. (Monatsb.) R. Acad. Sc. Berlin, 1870.

F. Stoliczka. On Indian and Malayan Amphibia and Reptiles, 4 plates. Journ. Asiat. Soc. Bengal, xxxix.; abstracted in Ann. Nat. Hist. Ser. 4, vi.

MOLLUSCA :—

A. Adams. On some proboscidiferous Gasteropods of the seas of Japan. Ann. Nat. Hist. Ser. 4, v.—On some genera and species of gasteropodous Mollusca collected by Mr. M'Andrew in the Gulf of Suez. Ibid. vi.

R. Bergh. Contributions to a monograph of *Pleurophyllidia*, 9 plates.—On the anatomy of the *Phyllidia*, 11 plates. Kröy. Tidsskr. Ser. 3, iv.

W. G. Binney. Bibliography of North-American Conchology, part 2. Smiths. Misc. Coll. ix.

W. G. Binney and T. Bland. Notes on the lingual dentition of Mollusca.—Note on *Vivipara lineata*. Ann. Lyc. Nat. Hist. New York, ix.—Land and freshwater shells of North America, part 1, numerous woodcuts. Smiths. Misc. Coll. viii.

T. Bland. Additional notes on the geographical distribution of land-shells in the West Indies. Ann. Lyc. Nat. Hist. New York, ix.

W. T. Blanford. Contributions to Indian Malacology, continued. Journ. Asiat. Soc. Bengal, 1870.—On *Georissa*, *Acmella*, *Tricula*, and *Cyathopoma milium*. Ann. Nat. Hist. Ser. 4, vi.

Marq. L. de Folin. On the classification of the shells of the family of Chemnitzidæ. Presented by the Author.

J. C. Galton. Anatomy of the River-Mussel, 1 plate. Pop. Sc. Review, ix.

H. H. Godwin-Austen. Descriptions of new *Diplommatinæ* from the Khasia Hills, 1 plate. Journ. Asiat. Soc. Bengal, 1870.

A. A. Gould. Report on the Invertebrata of Massachusetts: Mollusca, 27 plates and numerous woodcuts. Presented by the Boston Soc. Nat. Hist. on behalf of the Commonwealth of Massachusetts.

R. C. Greenleaf. On the double plate of *Aulacodiscus oreganus*. Proc. Bost. Soc. Nat. Hist. xii.

W. Houghton. On two Land-Planariæ from Borneo, woodcuts. Ann. Nat. Hist. Ser. 4, vi.

J. G. Jeffreys. British Conchology, 5 vols., 1862–1869. Purchased.

———. Norwegian Mollusca. Ann. Nat. Hist. Ser. 4, v.—Mediterranean Mollusca. Ibid. vi.

W. King. Histology of the testa of the class Palliobranchiata, 1 plate. Trans. R. Irish Acad. xxiv.

A. Macalister. On the mode of growth of discoid and turbinated shells. Proc. Roy. Soc. xviii.

W. Meigen. On the hydrostatic apparatus of *Nautilus pompilius*. Wiegm. Archiv, xxxvi.

E. S. Moore. A new *Actinobolus*, woodcut. Rep. Trust. Peabody Acad. Sc. 1869.—Salt- and freshwater Clams, 1 plate; and other Malacological papers. Amer. Naturalist, iii.

G. H. Perkins. Molluscan fauna of New Haven. Proc. Bost. Soc. Nat. Hist. xiii.

T. Prime. On the names applied to *Pisidium*, a genus of Corbicularidæ, with notes on species, woodcuts. Ann. Lyc. Nat. Hist. New York, ix.

R. Rattray. On the anatomy, physiology, and distribution of Firolidæ. Trans. Linn. Soc. xxvii.

L. Reeve. Conchologia Iconica, parts 282, 283. Purchased.

R. E. C. Stearns. On a new *Pedipes* from Tampa Bay. Proc. Bost. Soc. Nat. Hist. xii.

D. Zernoff. On the organs of smell in Cephalopods, 2 plates. Bull. Soc. Imp. Nat. Mosc. 1869, i.

Journal de Conchyliologie, Ser. 3, x. n. 3.—Malakozoologische Blätter, to July 1870.—American Journal of Conchology, v. parts 3, 4.

See also papers on Deep-Sea Dredgings, under LOWER ANIMALS.

CRUSTACEA AND ARACHNIDA :—

E. v. Beneden. On the embryogeny of Crustacea, 2 plates. Bull. R. Acad. Sc. Brussels, xxviii.

V. Bergsoe. *Philichthys Xiphiæ*, 1 plate.—On the Italian *Tarantula*. Kröy. Tidsskr. Ser. 3, iii.

V. Bergsoe and F. Meinert. The *Geophila* of Denmark. Kröy. Tidsskr. Ser. 3, iv.

P. Bertkau. On the structure and functions of the upper jaw in Spiders, 1 plate. Wiegm. Archiv, xxxvi.

G. S. Brady. Notes on Entomostraca taken in Northumberland and Durham, 3 plates. Nat. Hist. Trans. Northumb. & Durh. iii.

G. S. Brady and D. Robertson. The Ostracoda and Foraminifera of tidal rivers, 2 parts, 7 plates. Ann. Nat. Hist. Ser. 4, vi.

— Chantran. On the natural history of Crayfish (from the Comptes Rendus). Ann. Nat. Hist. Ser. 4, vi.

A. Dohrn. A new form of *Nauplius gigas*, 2 plates.—On Malacostraca and their larvæ, 3 plates. Zeitschr. wissensch. Zool. xx.

E. D. Cope. On some new or little-known Myriapoda from the Southern Alleghanies. Ann. Nat. Hist. Ser. 4, vi.

O. Grimm. Embryology of *Phthirius pubis*, 1 plate. Bull. Imp. Acad. Sc. Petersburg, xiv.

J. Lubbock. On *Thysanura*, part iv. Trans. Linn. Soc. xxvii.

J. A. Herklots. Two new genera of Crustacea, *Epichthys* and *Ichthyoxenos*, 1 plate. Archiv. Néerl. v.

H. Kröyer. Contributions to the knowledge of Entomostraca, 18 plates. Kröy. Tidsskr. Ser. 3, ii.

S. J. M'Intyre. The Pencil-tail, *Polyxenus lagurus*, 1 plate. Journ. Quek. Microsc. Club, ii.

F. Meinert. Campodeæ, a family of Thysanura, 1 plate. Kröy. Tidsskr. Ser. 3, ii.—The Chilognatha of Denmark; The Scolopendra and Lithobia of Denmark. Ibid. v.

R. E. Mueller. The Cladocera of Denmark, 6 plates.—On the propagation of Cladocera, 1 plate. Kröy. Tidsskr. Ser. 3, v.

M. F. Plateau. On the freshwater Crustacea of Belgium, 1 plate. Mém. cour. R. Acad. Sc. Brussels, 4to, xxxiv.

J. C. Schiödte. The sucking-mouth of Crustacea, 2 plates. Kröy. Tidsskr. Ser. 3, iv.

S. J. Smith. New or little-known American cancroid Crustacea. Proc. Bost. Soc. Nat. Hist. xii.

J. Steenstrup. On *Lesteira*, *Silenium*, and *Pegesimallus*, three genera of Crustacea established by Kröyer, 1 plate. Proc. R. Dan. Soc. Sc. 1869.

A. E. Verrill. Popular notes on Crustacea. Amer. Naturalist, iii.

E. P. Wright. New Sicilian Spiders, 1 plate. Ann. Nat. Hist. Ser. 4, v.

ENTOMOLOGY:—

E. Ballion. Remarks on some species of the 'Catalogus Coleopterorum' of Dr. Gemmingen and B. v. Harold.—On *Tenthredo flavicornis* and *T. luticornis*. Bull. Soc. Imp. Nat. Mosc. 1869.

M. v. Bell. List of Coleoptera hitherto found in the neighbourhood of Jaroslaw. Bull. Soc. Imp. Nat. Mosc. 1869.

Dr. Bessels. Note on the development of Acaridæ. Bull. R. Acad. Sc. Brussels, xxvii.

P. Butschli. On the development of Bees, 4 plates. Zeitschr. wiss. Zool. xx.

A. Chapman. Facts towards a life-history of *Rhipiphorus paradoxus*, 1 plate. Ann. Nat. Hist. Ser. 4, vi.

M. Chaudoir. Monographical essay on the genus *Abacetus*, Dej. Bull. Soc. Imp. Nat. Mosc. 1869.

— Cornelius. On *Zabrus gibbus*, Fabr., and its larvæ. Trans. Nat. Hist. Soc. Rhen. Pruss. xxvi.

E. T. Cresson. On Mexican Pompilidæ. Proc. Bost. Soc. Nat. Hist. xii.

N. Erschoff. Notes on some Lepidoptera of Eastern Siberia. Bull. Soc. Imp. Nat. Mosc. 1869.

A. Fuchs. Enumeration of the Butterflies of the neighbourhood of Oberursel. Journ. Nassau Soc. Nat. Sc. Jahrg. xxi., xxii.

A. Gerstäcker. Orthoptera and Neuroptera of Zanzibar. Wiegm. Archiv, xxxv.

A. Gærtner. On *Coleophora albifuscella*, Zell., and *C. leucopennella*, Hübn. Bull. Soc. Imp. Nat. Mosc. 1869.

R. Grentzenberg. The Macrolepidoptera of the province of Prussia. Mem. Phys. Econ. Soc. Königsberg, x.

O. Grimm. On the asexual reproduction of a species of *Chironomus*, and its development from an unfertilized egg, 3 plates. Mem. Imp. Acad. Sc. Petersb. xv.

A. E. Holmgren. Hymenoptera of the voyage of the frigate 'Eugénie,' 2 plates. Presented by the Roy. Acad. Sc. Stockholm.

J. H. Kaltenbach. The German phytophagous Insects. Trans. Nat. Hist. Soc. Rhen. Pruss. xxvi.

W. J. Kirby. On the generic nomenclature of Diurnal Lepidoptera. Journ. Linn. Soc. Zool. x.

C. L. Kirschbaum. The Cicadinæ of the neighbourhood of Wiesbaden. Journ. Nass. Soc. Nat. Sc. xxi., xxii.

— Landois. On the sounds emitted by Insects.—On a new American Silkworm, *Saturnia Cecropia*. Journ. Nat. Hist. Soc. Rhen. Pruss. xxvi.

J. L. Leconte. Synonymical notes on North-American Coleoptera. Ann. Nat. Hist. Ser. 4, vi.

De Selys Longchamps. Additions to the synopsis of Calopteryginæ. Bull. R. Acad. Sc. Brussels, xxvii.—Additions to the synopsis of Gomphinæ. Ibid. xxviii.

F. Meinert. The Danish species of *Forficula*, 1 plate. Kröy. Tidsskr. Ser. 3, ii.—On the larvæ of *Miastor*, 3 plates. Ibid. iii.—On double sperm-vessels in Insects, 1 plate. Ibid. v.

N. Melnikow. On the embryonal development of Insects, 4 plates. Wiegm. Archiv, xxxv.

C. S. Minot. American Lepidoptera. Proc. Bost. Soc. Nat. Hist. xiii.

V. Motchoulsky. Enumeration and descriptions of new Coleoptera. Bull. Soc. Imp. Nat. Mosc. 1869.

A. Murray. On Coleoptera from Old Calabar. Ann. Nat. Hist. Ser. 4, v.—List of Coleoptera received from Old Calabar, 2 plates. —Note on the egg of *Rhipiphorus paradoxus*.—History of the Wasp and *Rhipiphorus paradoxus* (concluded), 1 plate. Ibid. vi.—On the geographical relations of the chief Coleopterous Faunæ. Journ. Linn. Soc. Zool. xi.

E. Norton. Descriptions of Mexican Ants, woodcuts. Proc. Essex Inst. Salem, vi.

R. Osten-Sacken. Monographs of Diptera of N. America, part 4, 4 plates. Smithson. Misc. Coll. viii.

A. S. Packard, jun. On Insects inhabiting salt water, woodcuts. Proc. Essex Inst. Salem, vi.—List of hymenopterous and lepidopterous Insects collected by the Smithsonian Expedition to S. America. Ann. Rep. Trust. Peabody Acad. 1869.—Various popular entomological papers. Amer. Naturalist, iii.

A. S. Packard, jun., and others. Record of American Entomology for the year 1868. Presented by the Essex Institute, Salem.

F. P. Pascoe. On Curculionidæ (continued), 2 plates. Journ. Linn. Soc. Zool. x.

J. E. Planchon and J. Lichtenstein. On *Phylloxerus* or the Vine-disease, three papers. Presented by the Authors.

A. S. Ritchie. Why are Insects attracted by artificial lights? Canad. Naturalist, v.

C. Ritsema. On the origin and development of *Periphyllus Testudo*. Arch. Néerl. v.; Ann. Nat. Hist. Ser. 4, vi.

C. T. Robinson. Lepidopterological Miscellanies, two papers, 1 plate. Ann. Lyc. Nat. Hist. N. York, ix.

A. Schenck. Description of the Bees of Nassau, 2nd Supplement. Journ. Nass. Soc. Nat. Sc. xxi., xxii.

J. C. Schiödte. The Cerambyces of Denmark. Kröy. Tidsskr. Ser. 3, ii.—Observations on the metamorphoses of Eleutherata, 24 plates. Ibid. iii., iv., and vi.—The Buprestes and Elaters of Denmark, 1 plate, and various short Entomological Papers. Ibid. iii.—Supplement to the Cerambyces, Buprestes, and Elaters of Denmark. Ibid. v.—On the Cimices living in Denmark. Ibid. vi.—On the morphology and classification of Rhynchota. Ibid. vi.; Ann. Nat. Hist. Ser. 4, vi.

S. H. Scudder. Preliminary list of the Butterflies of Iowa. Trans. Chicago Acad. Sc. i.—Notices of Orthoptera collected by Prof. J. Orton in Ecuador and Brazil.—On the gigantic lobe-crested Grasshoppers of South and Central America.—Report on Diurnal Lepido-

ptera collected in Alaska in Lieut. Dall's Expedition.—On a new Cave-Insect from New Zealand. Proc. Bost. Soc. Nat. Hist. xii.—On the larva and chrysalis of *Papilio Rutulus*. Ibid. xiii.—Catalogue of Orthoptera of N. America described previous to 1867. Smithson. Misc. Coll. viii.

H. Shimer. Insects injurious to the Potato, woodcuts. Amer. Naturalist, iii.

S. Solsky. Coleoptera of Eastern Russia.—The Staphylina of S. America and Mexico, n. 2. Bull. Soc. Imp. Nat. Mosc. 1869.

V. Ström. The Danish species of *Orygia*. Kröy. Tidsskr. Ser. 3, iii.—Synopsis of the Butterflies of Denmark. Ibid. iv.

R. Trimen. On the occurrence of *Astraptor illuminator*, Murr., or a closely allied insect, near Buenos Ayres. Journ. Linn. Soc. Zool. x.

P. R. Uhler. Notices of Hemiptera collected by Prof. J. Orton in Ecuador and Brazil. Proc. Bost. Soc. Nat. Hist. xii.

F. Walker. Dermaptera and Hemiptera collected by J. K. Lord in Egypt and Arabia. Zoologist, v.

H. Weyenbergh, jun. Some observations on parthenogenesis in Lepidoptera. Archiv. Néerl. v.

H. C. Wood, jun. On the Phalangeæ of the United States, woodcuts. Proc. Essex Inst. Salem, vi.

Horæ of the Entomological Society of Russia, vi. n. 4.—The Hague Journal of Entomology, Ser. 2, iv. parts 3 to 6, v. parts 1, 2.—Snellen van Vollenhoven's Tijdschrift voor Entomologie, Ser. 2, iv. part 2.—Annales de la Société Entomologique de France, Ser. 4, ix. parts 2 to 4.—Entomologists' Monthly Magazine, July to Nov.—Entomological Society's Transactions, 1870, part 2.—Transactions of the Entomological Society of New South Wales, i. part 5.

LOWER ANIMALS :—

A. Agassiz. On the young state of the Echinida (from Bull. Mus. Comp. Zool.). Wiegm. Archiv, xxxvi.—On the habits of a few Echinoderms. Proc. Bost. Soc. Nat. Hist. xiii.

E. van Beneden. On a new *Gregarina*, 1 plate. Bull. R. Acad. Sc. Brussels, xxviii.

E. van Beneden and E. Bessels. On the formation of the blastoderm in Amphipoda, Lernea, and Copepoda, 5 plates. Mém. cour. R. Acad. Sc. Brussels, 4to, xxxiv.

H. B. Brady. A monograph of Polymorphina, 4 plates. Trans. Linn. Soc. xxvii.

H. B. Brady and D. Robertson. The Ostracoda and Foraminifera of tidal rivers, 2 parts, 9 plates. Ann. Nat. Hist. Ser. 4, vi.

W. B. Carpenter. On the temperature and animal life in the deep sea. Proc. R. Inst. vi.

W. B. Carpenter, J. Gwyn Jeffreys, and Wyville Thomson. Preliminary report of the scientific exploration of the deep sea in H.M.S. 'Porcupine,' 1869. Proc. Roy. Soc. xviii.

H. J. Carter. On *Haliphysema ramulosa*, Bowerb., and the sponge-spicules of *Polytrema*.—On *Anthozoanthus parasiticus*, Desh. —On *Myriosteon*. Ann. Nat. Hist. Ser. 4, v.—Two new species of subspherous Sponges, 1 plate.—On the ultimate structure of marine Sponges.—On the branched variety of *Squamulina scopula*. Ibid. vi.

M. Ganin. New facts in the history of the development of *Ascidia*. Zeitschr. wiss. Zool. xx.

— Gerlach. The Trichina, from a sanitary point of view. Proc. Nat. Hist. Soc. Hanover, 1867–69.

J. E. Gray. New Alcyonoid Corals in the British Museum, woodcuts. Ann. Nat. Hist. Ser. 4, v.—Notes on anchoring Sponges. Ibid. vi.

D. Greeff. On *Echinoderes* and *Desmoscolex*. Trans. Nat. Hist. Soc. Rhen. Pruss. xxvi.

N. E. Green. On ciliary action in Rotifera. Journ. Queck. Microsc. Club, ii.

A. Hancock. On the larval state of *Molgula*, with descriptions of several new species of simple Ascidians. Ann. Nat. Hist. Ser. 4, vi.

C. J. Hudson. On *Synchæta mordax*, 1 plate. Monthly Microsc. Journ. iv.

W. S. Kent. A new vitreous Sponge, *Pheronema Grayi*, 1 plate. —Sponges from off the coasts of Spain and Portugal.—Critique of Häckel's views of the affinities of Sponges.—On an existing Coral closely allied to the Palæozoic genus *Favosites*, 2 plates. Ann. Nat. Hist. Ser. 4, vi.—The Hexactinellidæ taken in the 'Norna' expedition off the coast of Spain and Portugal, 3 plates. Monthly Microsc. Journ. iv.

H. Krabbe. Researches on the Tæniæ of Birds, 10 plates. Trans. R. Dan. Soc. Sc. Ser. 5, viii.

A. Krohn. On the reproduction of Botryllida.—On a viviparous species of *Syllis*. Wiegm. Archiv, xxxv.

— Lacaze Duthiers. On the organization and embryogeny of *Ascidia* (from the Comptes Rendus). Ann. Nat. Hist. Ser. 4, vi.

E. R. Lankester. On the zoological affinities of the Sponges. Ann. Nat. Hist. Ser. 4, vi.

N. Miklucho-Maclay. Some Sponges of the N. Pacific and Arctic Oceans in the Zoological Museum of the Imperial Academy of Sciences, St. Petersburg, 2 plates. Mem. Imp. Acad. Sc. Petersb. xvi.—The Sponges of the White and Arctic seas. Bull. Imp. Acad. Sc. Petersb. xv.

A. J. Malmgren. On the occurrence of animal life at great depths in the sea (from Trans. Linn. Soc. Sc. Helsingfors). Zeitschr. wiss. Zool. xx.

E. Metchnikoff. Studies on the development of Echinoderms and Nemertines, 12 plates. Mem. Imp. Acad. Petersb. xiv.—Notes on some Echinoderms. Bull. Imp. Acad. Petersb. xiv.—On the development of some Cœlenterata. Ibid. xv.

St. G. Mivart. The *Echinus* or Sea-Urchin, 1 plate. Pop. Sc. Rev. ix.

E. S. Morse. The Brachiopods, a division of Annelids, woodcuts (from Sillim. Journ.). Ann. Nat. Hist. Ser. 4, vi.

E. L. Moss. On the anatomy of *Appendicularia*, 1 plate. Trans. Linn. Soc. xxvii.

E. Perrier. On the Circulation of the Oligochæta of the *Nais*-group (from the Comptes Rendus).—On the scissiparous reproduction of the Naidina (from the Comptes Rendus). Ann. Nat. Hist. Ser. 4, vi.

R. A. Philippi. On *Temnocephala chilensis*, ½ plate. Wiegm. Archiv, xxxvi.

T. G. Preston. A new parasite from the Tiger. Monthly Microsc. Journ. iv.

F. H. Troschel. On some new Sea-Urchins. Trans. Nat. Hist. Soc. Rhen. Pruss. xxvi.

R. Uljanin. On the anatomy and development of *Pedicellinæ*, 2 plates. Bull. Soc. Imp. Nat. Mosc. 1869.

A. E. Verrill. On new and imperfectly known Echinoderms and Corals. Proc. Bost. Soc. Nat. Hist. xii.—Synopsis of the Polypes and Corals of the N. Pacific Exploring Expedition (continued), 2 plates. Proc. Essex Inst. Salem, vi.

J. G. Waller. On the conjugation of *Actinophrys Sol*, 1 plate. Journ. Quek. Microsc. Club, ii.

— Williamson. On *Sphærosira volvox*, Ehrenb., 1 plate. Pop. Sc. Rev. ix.

R. M. Wright, jun. On Sponges. Amer. Naturalist, iii.

A. Wrzesniowski. Observations on the Infusoria of the neighbourhood of Warsaw, 3 plates. Zeitschr. wiss. Zool. xx.

PHÆNOGAMIC BOTANY :—

P. Ascherson. Conspectus of the marine Phanerogams of Italy. Nuov. Giorn. Bot. Ital. ii.

C. C. Babington. Revision of the flora of Iceland. Journ. Linn. Soc. Bot. xi.

H. Baillon. Histoire des Plantes: Lauracées &c., completing vol. 2.—Adansonia, vols. 1 to 8. Purchased.

J. G. Baker. On the world-distribution of British Caryophyllaceæ. —On British dactyloid Saxifrages. Seem. Journ. Bot. viii.—A revision of herbaceous capsular gamophyllous Liliaceæ. Journ. Linn. Soc. Bot. xi.

A. de Bary. On the flowers of some Cycadeæ. Bot. Zeit. 1870.

A. W. Bennett. Review of the genus *Hydrolea*, 1 plate. Journ. Linn. Soc. Bot. xi.

G. Bentham. Flora Australiensis, vol. 5. Presented by the Author.

G. Birdwood. On the genus *Boswellia*, 4 plates. Trans. Linn. Soc. xxvii.

A. Braun. On the flowers of *Podocarpus*. Bot. Zeit. 1870.

T. R. A. Briggs. On the Roses of the neighbourhood of Plymouth. Seem. Journ. Bot. viii.

F. Buchenau. Remarks on the flora of the islands of East Friesland, especially Borkum. Trans. Nat. Hist. Soc. Bremen, ii.

A. Bunge. Generis *Astragali* species gerontogeæ, part 2. Mem. Acad. Imp. Sc. Petersb. xv.—On the *Heliotropia* of the Mediterranean and Levant Floras. Bull. Soc. Imp. Nat. Mosc. 1869.

T. Caruel. On the floral structure and affinities of Eriocauloneæ. Mem. Soc. Imp. Sc. Nat. Cherbourg, xiv.—Second Supplement to the Prodromus of the Tuscan Flora. Nuov. Giorn. Bot. Ital. ii.

V. Cesati. On the *Musæ* of the Botanic Gardens of Naples.—On *Saxifraga florulenta*, Moretti. Nuov. Giorn. Bot. Ital. ii.

C. B. Clarke. On the Commelynaceæ of Bengal. Journ. Linn. Soc. Bot. xi.

J. Correa de Mello. On Brazilian plants from the neighbourhood of Campinas, 2 papers. Journ. Linn. Soc. Bot. xi.

N. A. Dalzell. On *Althæa Ludwigii* and *Cystanche tubulosa*. Journ. Linn. Soc. Bot. xi.

A. Devos. The naturalized and introduced plants of Belgium. Bull. R. Bot. Soc. Belgium, ix.

A. Ernst. Interesting plants in the neighbourhood of Caraccas. Vargasia, n. 7.

L. Gruner. Enumeration of plants collected on the Dnieper and Lower Konka rivers (continued). Bull. Soc. Imp. Nat. Mosc. ii.

D. Hanbury. On a species of *Ipomæa* affording Tampico Jalap, 1 plate. Journ. Linn. Soc. Bot. xi., and Pharmac. Journ. Ser. 2, xi.

H. T. Hance. A new *Pygeum*.—On *Viburnum tomentosum*, Thunb. —Exiguitates carpologicæ. Seem. Journ. Bot. viii.

G. C. v. Hasendonck. On *Thalictrum princeps*, a new (critical) species. Bull. Soc. R. Bot. Belg. viii.

C. Hasskarl. On *Diplanthera*. Flora, 1870.

F. Hegelmaier. On the ovules of Halorageæ. Bot. Zeit. 1870.

C. P. Hobkirk. On the subspecies of *Capsella Bursa-pastoris*. Bull. Soc. R. Bot. Belg. viii.

J. Kornicke. Supplement to the flora of the province Prussia, with critical notes and descriptions. Mem. Phys. Econ. Soc. Königsberg, viii.

S. Kurz. New or imperfectly known Indian plants, 3 plates. Journ. Asiat. Soc. Bengal, xxxix.

J. Lange. On the most important plants figured in part 47 of the 'Flora Danica.' Proc. R. Dan. Soc. Sc.

E. Lebel. Revision of the genus *Spergularia*. Mem. Soc. Imp. Sc. Nat. Cherbourg, xiv.

— Magnus. Conspectus of the Naiadeæ of Italy. Nuov. Giorn. Bot. Ital. ii.

C. J. Maximowicz. The species of *Ophiopogon* in the Petersburg herbarium.—Diagnoses of new Japanese and Mandschurian plants, 7th Decade. Bull. Acad. Imp. Sc. Petersb. xv.

J. Miers. Three new genera of Verbenaceæ from Chili, 3 plates. —On *Gœtzea* and *Espadea*, 1 plate. Trans. Linn. Soc. xxvii.

F. A. W. Miquel. New materials towards the history of Cycadeæ. —Contributions to the Flora of Japan. Arch. Néerl. v.

J. Mueller *Arg*. New Apocyneæ from New Caledonia. Flora, 1870.

R. A. Philippi. On the vegetation of the islands of S. Ambrosio and S. Felix, with descriptions of new plants, 1 plate. Bot. Zeit. 1870.

P. Rohrbach. On the European species of *Typha*.—On the ovules of *Typha*. Bot. Zeit. 1870.

T. J. Ruprecht. Flora Caucasi, part 1, 6 plates. Mem. Acad. Imp. Sc. Petersb. xv.

W. W. Saunders. Refugium Botanicum, vol. iii. part 3. Presented by the Author.

R. H. C. C. Scheffer. Observationes phytographicæ, Descriptions of new species &c., chiefly from the Indian archipelago. Naturh. Tijdschr. Ned. Ind. xxxi., and Flora, 1870.

B. Seemann. Review of Bignoniaceæ (continued).—On *Hydrocotyle plicantha*, Ces.—A new *Marcgravia* from Central America.—A new *Fernandoa* from tropical Africa. Seem. Journ. Bot. viii.

W. F. Suringar. A new species of *Argostemma*, 1 plate. Archiv. Néerl. v.

J. E. Teysmann. On *Lodoicea sechellarum*. Naturh. Tijdschr. Ned. Ind. xxxi.

P. de Visiani. Observations on the Linnean Herbarium. Nuov. Giorn. Bot. Ital. ii.

L. Warren. On the *dumetorum* group of British *Rubi*, separate copy. Presented by the Author.

H. A. Weddell. Notes on Cinchonas (from the Ann. Sc. Nat.), separate copy. Presented by the Author.

M. Willkomm and J. Lange. Prodromus Floræ Hispanicæ, conclusion of vol. ii. Purchased.

P. Wirtgen. Various papers on the Rhenish Flora especially *Rubi*. Trans. Nat. Hist. Soc. Rhen. Pruss. xxvi.

E. P. Wright. On the Flora of the Seychelles, 4 plates. Trans. R. Irish Acad. xxiv.

Physiological and Miscellaneous Botany :—

F. W. C. Areschoug. On the reticulate parenchyma-cells of the bark. Bot. Zeit. 1870.

— Bail. On androgynous inflorescences and hermaphrodite flowers in diclinous plants. Bot. Zeit. 1870.

C. Bailey. On the natural ropes used for packing cotton-bales in the Brazils. Seem. Journ. Bot. viii.

A. Batalin. On the action of light on some mono- and dicotyledons. Bull. Acad. Imp. Sc. Petersb. xv.

A. W. Bennett. On protandry and protogyny in British plants. Seem. Journ. Bot. viii.

A. Braun. On a monstrosity of *Podocarpus chinensis*. Bot. Zeit. 1870.

R. Caspary. A monstrosity of *Pinus Abies*, with leaves abnormally united, 1 plate. Mem. Phys. Econ. Soc. Königsberg, x.

— Engl. On the reproduction of *Hydrocharis Morsus-ranæ* by hybernacula. Bull. Soc. Sc. Nat. Strasbourg, 1868.

A. Gris. Anatomy of the pith of Ericineæ and other woody plants. Bull. Soc. Bot. Fr. xvii.

A. Guillard. On the organs by which the sap is returned from the leaves to the stem. Bull. Soc. Bot. Fr. xvii.

— Hanstein. On the first development of the axial and foliary organs of Phanerogams.—On the results of experiments on the development of some genera of Piperaceæ, and on root-growth. Trans. Nat. Hist. Soc. Rhen. Pruss. xxvi.

R. Hartig. On the growth in thickness of the stems of forest-trees. Bot. Zeit. 1870.

F. Hegelmaier. On the development of the parts of the flower in *Potamogeton*, 1 plate. Bot. Zeit. 1870.

F. Hildebrand. On Delpino's further observations on dichogamy in Plants. Bot. Zeit. 1870.—On the fertilizing arrangements in Fumariaceæ, 3 plates. Pringsh. Jahrb. vii.

G. Krauss. Observations on the influence of light and heat on the production of starch in Chlorophyll, 1 plate. Pringsh. Jahrb. vii.

T. Meehan. On the production of bracteæ in *Larix*.—On the law of development in the flowers of *Ambrosia artemisiæfolia*. Proc. Acad. Nat. Sc. Philadelphia, 1869.

A. Millardet. On the periodical and paratonic movements of the sensitive plant (*Mimosa pudica*), 6 plates. Mem. Soc. Sc. Nat. Strasbourg, vi.

H. v. Mohl. On the blue colouring of the fruits of *Viburnum Tinus*. Bot. Zeit. 1870.

E. Morren. On the contagion of variegation, 1 plate. Bull. R. Acad. Sc. Brussels, xxviii.

H. C. Perkins. Circulation of the latex in laticiferous vessels (from Amer. Naturalist). Monthl. Microsc. Journ. iv.

— Peyritsch. On Peloriæ in Labiatæ, 6 plates. Proc. Imp. Acad. Sc. Vienna, lx.

T. Pfaff. On the increase in density of an Oak during its whole period of vegetation. Proc. R. Bav. Acad. Sc. Munich, 1870.

E. Pfetzer. Contributions to the knowledge of the epidermal structure in Plants, 2 plates. Pringsh. Jahrb. vii.

N. W. R. Rauwenhoff. On the characters and formation of cork in Dicotyledons. Archiv. Néerl. v.

— Rudinsky. Experiments on the contents of the ashes of buckwheat at different periods of growth. Mem. Univ. Kazan, 1868.

T. Sieler. On the development of the inflorescence and flowers in Umbelliferæ, 2 plates. Bot. Zeit. 1870.

J. D. Tschistiakoff. Essay on the comparative anatomy of the stalks of some Lemnaceæ, 3 plates (in Russ. with a German abstract). Bull. Soc. Imp. Nat. Mosc. 1869.

D. Wetterhau. A remarkable monstrosity of *Salvia pratensis*. Bot. Zeit. 1870.

H. C. Wood. Medical activity of the Hemp-plant, prize essay. Proc. Amer. Phil. Soc. Philadelphia, xi.

CRYPTOGAMIC BOTANY:—

J. Anthony. On the structure of *Pleurosigma angulatum* and *P. quadratum*. Monthl. Microsc. Journ. iv.

F. Arnold. Lichenological fragments, 1 plate. Flora, 1870.

C. F. Austen. Characters of new Hepaticæ, chiefly North-American. Proc. Acad. Nat. Sc. Philadelphia, 1869.

J. G. Baker. Martius's Flora Brasiliensis: Filices, 51 plates. Purchased.

J. Bell. On Fungi and fermentation, 1 plate. Monthl. Microsc. Journ. iv.

M. J. Berkeley and C. E. Broome. On some species of *Agaricus* from Ceylon, 2 plates. Trans. Linn. Soc. xxvii.

E. Bescherelle. On the distribution of Mexican Mosses. Bull. Soc. Bot. Fr. xvii.

G. S. Brady. List of the freshwater Algæ of Northumberland and Durham. Nat. Hist. Trans. Northumb. & Durh. iii.

E. C. Broome. Remarks on fungi from the neighbourhood of Bath. Proc. Bath Nat. Hist. Field-Club, ii.

M. C. Cooke. On microscopic moulds (continued), 3 plates. Journ. Quek. Microsc. Club, ii.—New oriental edible Fungi. Seem. Journ. Bot. viii.

E. Delarue. Note on *Empusa muscæ*, Cohn, and its relation to Saprolegniæ, 2 plates. Bull. Soc. Imp. Nat. Mosc. 1869.

G. Dickie. Notes on some Algæ found in the North-Atlantic Ocean. Journ. Linn. Soc. Bot. xi.

D. C. Eaton. Notes on the Ferns of the herbaria of Linné and Michaux. Canad. Naturalist, v.

A. M. Edwards. Notes on Diatomaceæ. Proc. Bost. Soc. Nat. Hist. xiii.; Amer. Naturalist, iii.; and Monthl. Microsc. Journ. iv.

J. H. L. Flögel. On the structure of the cell-walls in *Pleurosigma*. Bot. Zeit. 1870.

— Garovaglio and G. Gibelli. On *Normandina Jungermanniæ*, Nyl., 1 plate. Nuov. Giorn. Bot. Ital. ii.

A. Geheeb. Bryological notes from the Rhöngebirge, with a new species. Flora, 1870.

G. Gibelli. On the genesis of the apothecia in Verrucariaceæ, 2 plates. Nuov. Giorn. Bot. Ital. ii.

J. B. Hicks. On the similarity between *Draparnaldia* and the confervoid filaments of Mosses, part plate. Trans. Linn. Soc. xxvii.

W. Hincks. An attempted improvement in the arrangement of Ferns. Canad. Journ. Sc. Litt. and Hist. Ser. 2, xii.

W. Hofmeister. On the sequence of cells in the axial summits of Mosses, woodcuts and photographs. Bot. Zeit. 1870.

H. Hoffmann. Mycological Reports.—Review of the most recent publications and papers in Mycology. Presented by the Author.

J. Klein. Researches on *Pilobolus*. Bot. Zeit. 1870.

G. Krauss and A. Millardet. On the colouring-matter in Phycochromaceæ and Diatomeæ. Mem. Soc. Sc. Nat. Strasbourg, vi.

— Lahm. *Lecidea Hellbomii*, a new species. Flora, 1870.

W. A. Leighton. Notulæ Lichenologicæ. Ann. Nat. Hist. Ser. 4, vi. —On the Lichens of St. Helena, part plate.—On *Sphæria tartaricola*, part plate.—On the Lichens of Ceylon, 2 plates. Trans. Linn. Soc. xxvii.

H. Leitgeb. On the growth of the stem and the development of antheridia in *Sphagnum*, 3 plates. Proc. Imp. Acad. Sc. Vienna, lix.

S. O. Lindberg. Contributions to British Bryology. Journ. Linn. Soc. Bot. xi.

E. Loew. Contributions to the history of the development of *Penicillium*, 3 plates. Pringsh. Jahrb. vii.

L. Meyer. The Mosses of the neighbourhood of Hanover. Proc. Nat. Hist. Soc. Hanover, 1867–69.

S. Miklos. Az Erjedés es as iy Gomba-elmélet. Pamphlet, presented by the Author.

J. Milde. Supplementary notes on *Asplenium* and allied genera. —On *Dicranodontium* and its allies. Bot. Zeit. 1870.

A. Millardet. On Collemaceæ, 3 plates.—On the germination of the zygospores in the genera *Closterium* and *Staurastrum*, and on a new genus of *Algæ chlorosporeæ*, 1 plate. Mem. Soc. Sc. Nat. Cherbourg, vi.

J. Mueller *Arg.* New Lichens.—Lichens of La Tournette and Pic Romand. Flora, 1870.

Th. Nitschke. Outlines of a system of Pyrenomycetæ. Trans. Nat. Hist. Soc. Rhen. Prussia, xxvi.

G. de Notaris and F. Baglietto. Erbario Crittogamico Italiano, Ser. 2.—Enumeration of species and descriptions of new ones. Nuov. Giorn. Bot. Ital. ii.

L. Piré. Revision of Belgian Acrocarpic Mosses. Bull. Soc. R. Bot. Belg. viii.

N. Pringsheim. Further explanations on the result of his observations on the pairing of zoospores. Bot. Zeit. 1870.

L. Reinhard. On the species of *Characium* found in the neighbourhood of Charkow, 1 plate. Bull. Soc. Imp. Nat. Mosc. 1869.

S. Rosanoff. On the influence of terrestrial attraction on the direction of the plasmodia in *Myxomycetes*, 1 plate. Mem. Soc. Imp. Sc. Nat. Cherbourg, xiv.

J. Schumann. Supplement to Prussian Diatoms, 4 plates. Mem. Phys. Econ. Soc. Königsberg, viii. and x.

D. v. Shelesnow. On the occurrence of the White Truffle in the neighbourhood of Moscow. Bull. Soc. Imp. Nat. Mosc. 1869.

W. G. Smith. Clavis Agaricinorum. Presented by the Author.

J. Walz. Contributions to the knowledge of Saprolegnieæ. Bot. Zeit. 1870.

H. C. Wood. Descriptions of new Desmids. Proc. Acad. Nat. Sc. Philad. 1869.—Prodromus of a study of the freshwater Algæ of eastern North America. Proc. Amer. Phil. Soc. Philadelphia, xi.

PALÆONTOLOGY:—

T. Atthey. On the occurrence of palatal teeth of a *Climatodus* in the low-main shale of Newsham. Nat. Hist. Trans. Northumb. Durh. iii.

A. Bell. New or little-known shells &c. of the crag formations. Ann. Nat. Hist. Ser. 4, vi.

P. J. van Beneden. On a new *Palæulaphus* from the Devonian. Bull. Acad. R. Sc. Brussels, xxvii.

G. Berendt. Supplement to the marine diluvial fauna of West Prussia, 1 plate. Mem. Phys. Econ. Soc. Königsb. viii.

A. Preudhomme de Borre. On some Chelonian remains from the tertiary deposits of the neighbourhood of Brussels. Bull. Acad. R. Sc. Brussels, xxvii.

J. F. Brandt. On the hair of *Rhinoceros tichorhinus*. Bull. Acad. Imp. Sc. Petersb. xiv.—Further researches on the remains of Mammifers found in the caves of the Altai. Ibid. xv.

A. Briart and F. L. Cornet. On the fossils of the Meule de Bracquegnies, 8 plates. Mém. cour. R. Acad. Sc. Bruss. 4to, xxxiv.

G. Burmeister. Monograph of Glyptodons of the public Museum of Buenos Ayres, 12 plates. Mus. Publ. Buenos Ayres, ii.

E. D. Cope. Descriptions of extinct Fishes. Proc. Bost. Soc. Nat. Hist. xii.—Synopsis of extinct Mammalia of the cave formations of the United States, 3 plates.—Second addition to the history of the Fishes of the cretaceous of the United States. Proc. Amer. Phil. Soc. Philadelphia, xi.—Fossil Reptiles of New Jersey. Amer. Naturalist, iii.

Principal Dawson. On the primitive vegetation of the earth. Proc. Roy. Instit. vi.

— v. Duisburg. Contributions to the Amber-fauna. Mem. R. Phys. Econ. Soc. Königsberg, ix.

C. G. Ehrenberg. On the *Bacillaria*-banks of the Californian Highlands. Proc. R. Acad. Sc. Berlin (Monatsber.), 1870.

C. v. Ettingshausen. The fossil Flora of the tertiary basin of Bilin, part 3, 16 plates. Mem. Imp. Acad. Sc. Vienna, xxix.—Contributions to the tertiary flora of Styria, 6 plates, Proc. Imp. Acad. Sc. Vienna, lx.

H. H. Godwin-Austen. Descriptions of new *Diplommatina* from the Khasia hills, 1 plate. Journ. Asiat. Soc. Bengal, 1870.

J. E. Gray. On the skeleton of *Dioplodon sechellensis*, woodcut. Ann. Nat. Hist. Ser. 4, vi.

A. Hancock and T. Atthey. Description of a Labyrinthodont Amphibian from the coal-shale of Newsham, 1 plate. Ann. Nat. Hist. Ser. 4, vi.—A new Labyrinthodont Amphibian.—On *Anthracosaurus*.—On fossil Fungi.—On *Climaxodon* and *Janassa*, 1 plate. Nat. Hist. Trans. Northumb. & Durh. iii.

A. Hancook and R. Howse. On *Janassa bituminosa*, 2 plates. Nat. Hist. Trans. Northumb. Durh. iii.

F. Kitton. Diatomaceous deposits from Jutland, 3 plates. Journ Quek. Microsc. Club, ii.

L. de Koninck. On some remarkable palæozoic Echinoderms. Bull. Acad. R. Sc. Brussels, xxviii.

G. C. Laube. On the Echinoderms of the tertiary formation of the Vicentine, 7 plates. Mem. Imp. Acad. Sc. Vienna, xxix.

A. Manzoni. Italian fossil Bryozoa, 2 plates. Proc. Imp. Acad. Sc. Vienna, lix.

A. Milne-Edwards. On the ornithological fauna of the Bourbonnais during the middle tertiary period (from Comptes Rendus). Ann. Nat. Hist. Ser. 4, v.

C. Moore. On the mammalia and other remains from the

drift deposit in the Bath basin. Proc. Bath Nat. Hist. Field-Club, ii.

H. A. Nicholson. On the genus *Climacograpsus*, with notes on the British species, woodcuts. Ann. Nat. Hist. Ser. 4, vi.

R. Owen. On the remains of a large extinct Llama from quaternary deposits in the valley of Mexico, 4 plates.—On the molar teeth of the lower jaw of *Macrauchenia patachonica*, 1 plate. Phil. Trans. R. Soc. clx.

C. F. Peters. The vertebrata in the miocene strata of Eibiswald in Styria: 1. Tortoises, 3 plates and 1 woodcut; 2. *Amphicyon*, *Viverra*, and *Hyotherium*, 3 plates. Mem. Imp. Acad. Sc. Vienna, xxix.

A. E. Reuss. Palæontological studies on the older tertiary strata of the Alps, 20 plates. Mem. Imp. Acad. Sc. Vienna, xxix.—The fossil Mollusca of the tertiary basin of Vienna, 18 plates. Trans. Geol. Inst. Vienna, iv.—On the fossil fauna of the Oligocene strata of Gaas, 6 plates. Proc. Imp. Acad. Sc. Vienna, lix.

T. Rupert Jones. On ancient Water-fleas of the ostracodous and phyllopodous tribes, 1 plate. Monthl. Microsc. Journ. iv.

W. P. Schimper. Traité de Paléontologie végétale, vol. ii., 20 plates. Presented by the Author.

C. Schlüter. Fossil Echinoderms of North Germany. Trans. Nat. Hist. Soc. Rhen. Pruss. xxvi.

H. G. Seeley. Remarks on Prof. Owen's monograph of *Dimorphodon*, woodcuts. Ann. Nat. Hist. Ser. 4, vi.

F. Toula. Some fossils of the coal-chalk of Bolivia, 1 plate. Proc. R. Acad. Sc. Vienna, lix.

F. Unger. The fossil flora of Radobaj, 5 plates. Mem. Imp. Acad. Sc. Vienna, xxix.

J. Wright. On the teeth of the Ballan Wrasse, 1 plate. Nat. Hist. Trans. Northumb. & Durh. iii.

E. G. Zaddack. On the amber of West Prussia and Pomerania, 1 plate. Mem. Phys. Econ. Soc. Königsberg, x.

Geological Society. Quarterly Journal, xxvi.—Geological Magazine, viii.

MISCELLANEOUS :-

L. Agassiz. Address on the Humboldtian Anniversary. Presented by the Boston Society of Natural History.

R. Andreini. Anthropology, pamphlet, 4to: Algiers, 1870. Presented by Mr. Darwin.

H. C. Bastian. Facts and reasonings concerning the heterogenous evolution of living things. Nature, ii.

H. Cleghorn. Anniversary Address to the Botanical Society of Edinburgh, 1869–70. Presented by the Author.

W. A. Föcke. The popular names of plants in the region of the lower Weser and the Ems. Trans. Nat. Hist. Soc. Bremen, ii.

Forest Reports. British Burmah, 1867–68.—Province of Oudh, 1868–69. Presented by the Indian Government.

L. Häpke. The popular names of animals in N.W. Germany. Trans. Nat. Hist. Soc. Bremen, iii.

T. F. Hayden. Report of the United States Geological Survey of Colorado and New Mexico.—Geological Report of the exploration of Yellowstone and Missouri Rivers. Presented by the Author.

L. Jenyns. Anniversary Address of the President of the Bath Natural-History Society, 1870. Presented by the Author.

M. Johnson. Remarks on Dr. Bastian's papers on spontaneous generation. Monthl. Microsc. Journ. iv.

Baron v. Liebig. On fermentation and the source of muscular power. Proc. R. Bav. Acad. Sc. Munich, 1869.

H. Mueller. On the application of the Darwinian theory to flowers and flower-seeking insects. Trans. Nat. Hist. Soc. Rhen. Pruss. xxvi.

F. P. Porcher. Resources of the southern fields and forests, with a Medical Botany of the Southern States, 1869. Presented by the Author.

R. Pulteney. Various MSS., chiefly on the botany of the neighbourhood of Loughborough. Presented by Dr. Hicks.

Revue des Cours Scientifiques. Translation of the Anniversary Address of the President of the Linnean Society, 1870. Presented by the Editors.

Samuel, Brothers. Wool and woollen manufactories of Great Britain. Presented by the Authors.

— Voit. On the difference between animal and vegetable nutrition. Proc. R. Acad. Sc. Munich, 1869.

F. Wakefield. The Gardener's Chronicle for New Zealand. Presented by the Author.

The following papers were read:—

1. "Notes on a Solitary Bee allied to the Genus *Anthidium*, Latr.," by J. P. Mansel Weale, Esq., B.A.

2. "Notes on some Species of *Habenaria* found in South Africa," by the same.

3. "Notes on a Species of *Disperis* found in the Hagaberg, South Africa," by the same.

4. "Some Observations on the Fertilization of *Disa macrantha*," by the same.

5. "Some Observations on the mode in which certain Species of *Asclepiadeæ* are Fertilized," by the same.

All communicated by Charles Darwin, Esq., F.R. & L.S.

November 17th, 1870.

Joseph D. Hooker, M.D., Vice-President, in the Chair.

The following papers were read:—

1. "Contributions to the Natural History of the *Passifloraceæ*," by Maxwell T. Masters, M.D., F.R. and L.S.

2. "Notes on the White-beaked Bottle-nose (*Lagenorhynchus albirostris*, Gray)," by James Murie, M.D., F.L.S., late Prosector to the Zoological Society.

December 1st, 1870.

George Bentham, Esq., President, in the Chair.

George King, M.B., the Rev. Frederick Silver, and Francis Lesiter Soper were elected Fellows.

The following papers were read:—

1. "Supplementary note on Chinese Silkworm-Oaks," by Henry Fletcher Hance, Ph.D., &c.

2. "On the source of the 'Radix Galangæ minoris' of Pharmacologists," by the same. Both communicated by the President.

December 15th, 1870.

George Bentham, Esq., President, in the Chair.

James Cosmo Melvill, Jun., Esq., was elected a Fellow.

Mr. Daniel Hanbury, F.L.S., exhibited fresh fruits of *Thladiantha dubia*, Bunge, a Cucurbitaceous plant from Northern China, ripened in the open air at Clapham, in November last.

The following papers were read, viz.:—

1. "On Sabadilla from Caracas (*Asagræa officinalis*, Lindl.)," by M. A. Ernst, of Caracas. Communicated by J. D. Hooker, M.D., V.P.L.S., &c.

2. A letter, dated Sierra Nevada, California, Oct. 28, 1870, from William Robinson, F.L.S., to Dr. Hooker, on the Californian Pitcher-plant (*Darlingtonia californica*, Torrey).

3. "Carnivorous and Insectivorous Plants," by Mrs. Barber. Communicated by Dr. Hooker.

At a Meeting subsequently held, and which had been specially summoned for the Election of a Member of Council in place of Thomas Anderson, M.D., deceased, John Lindsay Stewart, M.D., was elected into the Council in his stead.

January 19th, 1871.

George Bentham, Esq., President, in the Chair.

Louis Bernays, Esq., the Rev. Arthur Raggett Cole, M.A., George Curling Joad, Esq., Thomas Kirk, Esq., Dr. S. E. Maunsell, R.A., and Roland Trimen, Esq., were elected Fellows.

Mr. T. B. Flower, F.L.S., exhibited specimens of *Caucalis latifolia*, gathered by him in corn-fields, near Keynsham, Gloucestershire.

The following papers were read, viz.:—

1. "Historical Notes on the *Radix Galangæ* of Pharmacy," by Daniel Hanbury, Esq., F.R. & L.S.

2. Letter from Mr. Atkin to Dr. Hooker on the vegetation of the Solomon Islands.

3. "Note on the genus *Byrsanthus*, Guill., and its floral conformation," by Maxwell T. Masters, M.D., F.R. & L.S.

Read, also, a letter from Baron Hochschild, the Swedish Minister, announcing, on the part of Mr. Oscar Dickson, of Gothenburg, the donation of documents relating to Linnæus's discovery of a mode of producing artificial Pearls: and also transmitting, for the inspection of the Fellows, a photographic Album "In Memoriam Caroli à Linné," recently published in Sweden.

February 2nd, 1871.

George Bentham, Esq., President, in the Chair.

Charles Whitehead, Esq., was elected a Fellow.

Dr. Hooker, V.P.L.S., exhibited fruit-bearing specimens, preserved in fluid, of the India-rubber plant of Tropical Africa (*Landolphia florida*, Benth.?), collected on the Congo River by Dr. Hilliard, and sent to the Royal Gardens, Kew, by Messrs. Sinclair and Hamilton; also, two flowering specimens from the Kew Herbarium, collected by the late Mr. Barter during the Niger Expedition.

The following paper was read, viz.:

"Natural History of Deep-sea Soundings (2800 fathoms) between Galle and Java," by Capt. William Chimmo, of H.M.S. 'Nassau.' Communicated by Dr. Carpenter, F.L.S. &c.

February 16th, 1871.

George Busk, Esq., Vice-President, in the Chair.

Dr. Hooker, on behalf of the following Subscribers, presented to the Society a portrait, in oil, of the President, painted by Lowes Dickinson, Esq.: and the Chairman, on the part of the Fellows of the Society, expressed their sense of obligation to the Subscribers.

and the gratification which he was sure would be generally felt at the reception of a portrait of one who had laboured so earnestly, and for so many years, to further, in every way, the interests of the Society.

Dr. T. Anderson (the late).
Edward Atkinson, Esq.
Prof. C. C. Babington.
Rev. Churchill Babington.
A. H. Barford, Esq.
J. J. Bennett, Esq.
Prof. Bentley.
Rev. M. J. Berkeley.
John Blackwall, Esq.
Dr. Bowerbank.
Dr. Boycott.
Sir H. J. J. Brydges, Bart.
William Bull, Esq.
Sir C. Bunbury, Bart.
George Busk, Esq.
Dr. Campbell.
Henry Collinson, Esq.
E. W. Cooke, Esq.
Rev. T. Cornthwaite.
William Coulson, Esq.
Charles Darwin, Esq.
J. W. Dunning, Esq.
Dr. Eatwell.
M. P. Edgeworth, Esq.
Thomas B. Flower, Esq.
W. H. Flower, Esq.
John Forster, Esq.
William Francis, Esq.
D. J. French, Esq.
C. H. Gatty, Esq.
Dr. J. E. Gray.
Arthur Grote, Esq.
Daniel Hanbury, Esq.
Rev. H. Hawkes.
I. Anderson Henry, Esq.
Robert Hogg, LL.D.
Dr. Hooker.
Robert Hudson, Esq.
Prof. Huxley.
Richard Kippist.
J. Sutherland Law, Esq.
Prof. M. A. Lawson.
Henry Lee, Esq.
Sir J. Lubbock, Bart.
Sir C. Lyell, Bart.
Rev. R. W. McAll.
Robert MacLachlan, Esq.
George MacLeay, Esq.
William Matchwick, Esq.
John Miers, Esq.
J. Traherne Moggridge, Esq.
Major-General Munro.
Sir R. I. Murchison, Bart.
Prof. Oliver.
F. P. Pascoe, Esq.
Algernon Peckover, Esq.
Dr. Prior.
Henry Reeks, Esq.
F. C. S. Roper, Esq.
H. C. Rothery, Esq.
W. F. Saunders, Esq.
W. Wilson Saunders, Esq.
Samuel Saywell, Esq.
H. T. Stainton, Esq.
Dr. J. L. Stewart.
Andrew Swanzy, Esq.
H. Fox Talbot, Esq.
Dr. Thomas Thomson.
Dr. Thwaites.
John Van Voorst, Esq.
H. J. Veitch, Esq.
J. G. Veitch, Esq. (the late).
Dr. G. C. Wallich.
James Yates, Esq.

The following papers were read, viz.:—

1. "Bryological Remarks," by S. O. Lindberg, M.D.

2. "Notes on the Tremellineous Fungi and their Analogues," by L. R. Tulasne, F.M.L.S., and C. Tulasne.

March 2nd, 1871.

George Bentham, Esq., President, in the Chair.

The following papers were read, viz.:—

1. "On the Tamil popular names of plants," by the Rev. Samuel Mateer, F.L.S.

2. "Contributions towards a knowledge of the *Curculionidæ*, part 2," by Francis P. Pascoe, Esq., F.L.S.

March 16th, 1871.

George Bentham, Esq., President, in the Chair.

Lieut.-Colonel James Augustus Grant, C.B., C.S.I., &c., was elected a Fellow.

The President exhibited specimens of *Cupania cinerea*, Pœppig, collected by Mr. Spruce in Peru, with the observation that "the embryos fall out of the seeds; while the latter, with their aril, contained in the burst capsule, still remain on."

Dr. Seemann, F.L.S., exhibited a beetle, allied to *Dynastes* and supposed to be the largest Coleopterous insect of America. This, the only specimen found, though much search had been made for others, was obtained from the Chontales mountains of Nicaragua.

The following communications were read, viz.:—

1. Extract of a letter from General Munro, C.B., to Dr. Hooker, V.P.L.S., dated H.M.S. 'Royal Alfred,' Caribbean Sea, February 21, 1871, and containing notes on the botany of Antigua, Trinidad, St. Vincent's (with its extinct volcano Souffrière), and other West-India Islands.

2. A letter from Henry Reeks, Esq., F.L.S., on the varieties of *Aspidium aculeatum* and *angulare*. The letter was accompanied by a series of specimens, all gathered at East Woodhay, near Newbury.

3. "Notes on *Capparis galeata*, Fresen., and *C. Murrayi*, J. Graham," by N. A. Dalzell, Esq. Communicated by Dr. Hooker, F.R.S. &c.

April 6th, 1871.

George Bentham, Esq., President, in the Chair.

The following papers were read, viz.:—

1. "Notes on the Styles of Australian *Proteaceæ*," by George Bentham, Esq., F.R.S., Pres. L.S.

2. "On the Generic Nomenclature of *Lepidoptera*," by G. R. Crotch, M.A., Assistant Librarian in the University of Cambridge. Communicated by Alfred Newton, Esq., F.R. & L.S.

April 20th, 1871.

George Bentham, Esq., President, in the Chair.

Adolphus Frederick Haselden, Esq., William Hatchett Jackson, Esq., and Albert Müller, Esq., were elected Fellows.

The following communications were read, viz.:—

1. "Notes on a paper, by Mr. Andrew Murray, F.L.S., on the Geographical Relations of the chief Coleopterous Faunæ," by Roland Trimen, Esq., F.L.S., F.Z.S., M.E.S.

2. Extract of a letter from Mr. Murray, on the relations between the Fauna and Flora of South Africa and the Mediterranean element of the European region.

May 4th, 1871.

George Bentham, Esq., President, in the Chair.

Professor Oswald Heer, of Zurich, was elected a Foreign Member.

Mr. F. P. Balkwill, F.L.S., exhibited a specimen of Floral Prolification in *Jasione montana*, found at Borisand, near Plymouth.

The following papers were read, viz.:—

1. "The phenomena of Protective Mimicry, and its bearing on the theory of Natural Selection, as illustrated by the Lepidoptera of the British Islands," by Raphael Meldola, F.C.S. Communicated by A. G. Butler, Esq., F.L.S.

2. "An attempt towards a Systematic Classification of the family *Ascalaphidæ*," by Robert MacLachlan, Esq., F.L.S.

May 24th, 1871.

Anniversary Meeting.

George Bentham, Esq., President, in the Chair.

This day, the Anniversary of the Birth of Linnæus, and the day appointed by the Charter for the Election of Council and Officers, the President opened the business of the Meeting with the following Address:—

Gentlemen,—

Having now for the tenth time the honour of addressing you from this Chair on the occasion of your annual gathering, it has been my wish to lay before you a general sketch of the progress making in Systematic Biology, the foundation upon which must rest the theoretical and speculative as well as the practical branches of the science, to report upon the efforts made further to investigate, establish, and extend that foundation, and to convert the numerous quicksands with which it is beset into solid rock. This subject formed the chief portion of my Address of 1862, and again of those of 1866 and 1868; but on the present occasion I have had some difficulties to contend with. Mr. Dallas, to whose kindness I owed the zoological notes I required, has now duties which fully absorb his time; and I have been obliged to apply to foreign correspondents, as well as to my zoological friends at home, for the necessary information. They have one and all responded to my call with a readiness for which I cannot too heartily express my thanks*; and

* The gentlemen to whom I am more especially indebted for the useful memoranda they have transmitted to me are: Dr. Lutken, through Dr. Lange of Copenhagen, for Denmark; Dr. Andersson and his zoological colleagues at Stockholm for the Scandinavian peninsula; M. Trautvetter, and through him

if there is some diversity in the extent and nature of the information I have received from different countries, which may prevent any very correct estimate of the comparative progress made in them, it is owing to the questions which I put having been stated too generally, and, though sent in the same words to my various correspondents, having been differently understood by them. In such a review, however, as I am able to prepare, I propose chiefly to consider the relative progress made by zoologists and botanists in the methods pursued and the results obtained,—in the first place as to general works common to all countries, and, secondly, as to those which are more particularly worked out in, or more specially relate to, each of the principal states or nations where biological science is pursued, prefacing this review by a few general remarks supplementary to those I laid before you in my first Address in 1862.

Since that time systematic biology has to a certain degree been cast into the background by the great impulse given to the more speculative branches of the science by the promulgation of the Darwinian theories. The great thunderbolt had, indeed, been launched, but had not yet produced its full effect. We systematists, bred up in the doctrine of the fixed immutability of species within positive limits, who had always thought it one great object to ascertain what those limits were and by what means species, in their neverending variations and constant attempts to overstep those limits, were invariably checked and thrown back within their own domain, we might at first have felt disposed to resist the revolutionary tendency of the new doctrines; but we felt shaken and puzzled. The wide field opened for the exercise of speculative tendencies was soon overrun by numerous aspirants, a cry of contempt was raised against museum zoologists and herbarium botanists, and nothing was allowed to be scientific which was not theoretical or microscopical. But this has been carried, in some instances, too far. If facts without deductions are of little avail, assumptions without facts are worse than useless. Theorists in their disputes must bring forth the

M. von Schrenk of St. Petersburg, for Russia; Professor Troschel of Bonn for Central Europe; M. Alois Humbert, through M. de Candolle, for Switzerland; Sign. d'Achiardi on the part of Dr. Adolfo Savi, who was in attendance at his father's deathbed, for Italy; M. Decaisne and his zoological colleagues at the Jardin des Plantes (who, in the midst of their severe tribulations, kindly answered my queries during the short interval between the two sieges) for France. Professor Verrill, through Professor A. Gray, for the United States; and at home I have most cordially to thank Dr. Sclater, Mr. Salvin, Mr. Gwyn Jeffreys, Mr. Stainton, Mr. M'Lachlan, and others of our Fellows, who have ever showed themselves most ready to reply to any questions I have put to them.

evidences they rely upon; and these evidences can only be derived from and tested by sound systematic Biology, which must resume, and is resuming, its proper position in the ranks of science, controlled and guided in its course by the results of those theories for which it has supplied the bases *. If the absolute immutability of races is no longer to be relied upon, the greater number of them (whether genera, species, or varieties) are at the present or any other geological period practically circumscribed within more or less definite limits. The ascertaining those limits in every detail of form, structure, habit, and constitution, and the judicious appreciation of the very complicated relations borne to each other by the different races so limited, are as necessary as the supplementing the scantiness of data from the depths of Teutonic consciousness or by the vivid flashes of Italian imagination, or as the magnifying minute and as yet undeveloped organisms with a precision beyond what is fully justified by our best instruments.

I am, however, far from denying, on the one hand, how much biological science has of late been raised, since it has been brought to bear, through well-developed theories and hypotheses, upon the history of our globe and of the races it has borne, and, on the other, how very much the systematic basis upon which it rests has been improved and consolidated by the assiduous use of the microscope and the dissecting-knife; but I would insist upon the necessity of equal ability being applied to the intermediate processes of method or nomenclature and classification, which form the connecting-link between the labours of the anatomist and the theorist, reducing the observations of the one to forms available for the arguments of the other. All three (the minute observer, the systematist, and the theorist), thus assisting each other, equally contribute to the general advancement of science; and for all practical application the systematist's share of duty is certainly the most important.

The quicksands to which I have alluded as besetting this the foundation of biological science may be classed as imperfect data and false data, imperfect method and false method. To show what progress is making in removing or consolidating them, it may be useful to consider what these data are, and what are our means of fixing them so as to be readily available for use.

It must, in the first place, be remembered that the races whose relations to each other we study can only be present to our minds in

* The great importance of morphology and classification, the elements of systematic biology, has been forcibly illustrated by Professor Flower in his last year's introductory lecture at the Royal College of Surgeons.

an abstract form. In treating of a genus, a species, or a variety, it is not enough to have one individual before our eyes; we must combine the properties belonging to the whole race we are considering, abstracted from those peculiar to subordinate races or individuals. We cannot form a correct idea of a species from a single individual, nor of a genus from a single one of its species. We can no more set up a typical species than a typical individual. If we had before us an exact individual representative of the common parent from which all the individuals of a species or all the species of a genus have descended—or, if you prefer it, an exact copy of the model or type after which the whole species or genus had been created—we should have no possible means of recognizing it. I once heard a lecture by a German philosophical naturalist of considerable reputation in his day, in which he thought he proved that the common Clover was the type of Papilionaceæ. His facts were correct enough, but his arguments might have been turned in favour of any other individual species that might have been selected. Suppose two individuals of a species, two species of a genus, two genera of a family, in one of which certain organs are more developed, more differentiated, or more consolidated than in the other; if we agree upon the question of which is the most perfect, a point upon which naturalists seldom do agree, how are we to determine which represents the common parent or model? whether the perfect one is an improvement upon or an improved copy, or the imperfect one a degeneracy from or a bad imitation of the other? No direct evidence goes beyond a very few generations; reasoning from analogy is impossible without direct evidence to start from; and the imaginary type without either is the business of the poet, not of the naturalist.

It follows that every such abstract idea of a race must be derived from the observation, by ourselves or by others, of as large a number of the constituent individuals as possible. However fixed a race may be, if fixed at all, in nature, that is not the case with our abstract idea of it: no species or genus we establish can be considered as absolute; it will ever have to be completed, corrected, or modified, as more and more individuals come to be correctly observed. Hence it is that a species described from a single specimen, and even a genus established on a single species, always excites more or less of suspicion, unless supported by strong reasoning from analogy or confirmed by repeated observation.

Our means of observing and methodizing biological facts, of establishing and classifying those abstract ideas we call varieties, species, genera, families, &c., consist in the study (1) of living

individual organisms, (2) of preserved specimens, (3) of pictorial delineations, and (4) of written descriptions. Each of these sources of information has its special advantages, but each is attended by some special deficiencies to be supplied by one or more of the others.

1. The study of living individuals in their natural state is without doubt the most satisfactory; but very few such individuals can be simultaneously observed, for the purpose of comparison, and no one individual at any one moment can supply the whole of the data required, relating even to that individual. Some additional facilities in these respects are given by the maintenance of collections of living animals and plants, particularly useful in affording the means of continuous observation during the various phases of the life of one and the same individual, and sometimes through successive generations, or in facilitating the internal examination of organisms immediately after death, when the great physiological changes consequent upon death have only commenced. But there are drawbacks and difficulties to be overcome, as well as a few special sources of error to be guarded against; and in this respect, as well as in the progress recently made in their application to science, there is a marked difference between zoological and botanical living collections, or so-called gardens.

The great drawback to living collections, especially zoological, is their necessary incompleteness. At the best it is individuals only, not species, and in a few cases genera, that are exposed to observation. Genera, indeed, can always be better represented than species, for a few species bear a much larger proportion to the total number contained in a genus than a few individuals to the total number which a species contains. Whole classes are entirely wanting in zoological gardens, which are usually limited to Vertebrata. Of late years means have been found to include a few aquatic animals of the lower orders; but insects, for instance, those animals which exercise the greatest influence on the general economy of nature, the observation of whose life and transformations is every day acquiring greater importance, are wholly unrepresented in zoological gardens. The shortness of duration of their individual lives, their enormous powers of propagation, the different mediums in which they pass the different stages of their existence, will long be obstacles to the formation of living entomological collections on any thing like a satisfactory scale. The cost, also, of the formation and maintenance of living collections is very much greater in the case of animals than of plants; but, on the other hand, zoologists have the advantage of the attractiveness of their menageries to the general unscientific

but paying public; and by judicious management some sacrifices to popular tastes are far outweighed by the additional funds obtained towards rendering their collections useful to science.

The false data or errors to be guarded against in the observation of living zoological collections are chiefly owing to the unnatural conditions in which the animals are placed. Ungenial climate, unaccustomed food, want of exercise, &c. act upon their temper, habits, and constitution; and confinement materially modifies circumstances connected with their propagation. Such errors or false data are no doubt as yet very few and unimportant compared with those which have arisen from the reliance on garden plants for botanical observations; but as zoological gardens multiply and extend, they will have to be more and more kept in view.

In my younger days there were already a number of small collections of living animals, but almost all either travelling or local menageries, exhibited for money by private individuals, or small collections, kept up as a matter of curiosity for the benefit of the public, such as those of the Pfauen Insel at Potsdam, the park at Portici, or our own Tower menagerie. At Paris alone, at the Jardin des Plantes, in the flourishing days of the Jussieus and Cuviers, was the living zoological collection rendered essentially subservient to the purposes of science. Since then, however, matters have much changed. The Jardin des Plantes, which so long reigned supreme, has, by remaining stationary, sunk into a second rank. She may, indeed, be as justly as ever proud of her Milne-Edwards, her Brongniart, her Decaisne, and many others; but, long out of favour with the government and the paying public, who transferred their patronage to the high-sounding Jardin d'Acclimatation, now no more, she has been almost abandoned to the resources of pure science, always of the most restricted in a pecuniary point of view. We, in the mean time, and, after our example, several Continental states or cities, have made great advances. The formation of our Zoological Society and Gardens opened a new era in the cultivation of the science. After various vicissitudes, the Society had the good fortune to secure the services of one who combined in the highest degree zoological eminence with administrative ability; and this, our great living zoological collection, is now raised to the proud relative position which the Jardin des Plantes once held, and which there seems every reason to hope it will long maintain. With an annual income of about £23,000, the Zoological Society is enabled to maintain a living collection of about a thousand species of Vertebrata; and although some portion of the surplus funds is neces-

sarily applied for the sole gratification of the paying public, yet a fair share is devoted to the real promotion of that science for which all the Fellows are supposed to subscribe—the accurate observation of the animals maintained, the dissection of those that die, and the publication of the results. Physiological experiments are either actually made in the garden or promoted and liberally assisted (such, for instance, as those on the transfusion of blood, the effects or non-effects of which were recently laid before the Royal Society by Mr. F. Galton); a very rich zoological library has been formed; and last year's accounts show a sum of about £1800 expended in the Society's scientific publications.

Zoological gardens after the example of the London one have been established, not only in several of our provincial towns, but in various Continental cities, amongst which the more important ones, as I am informed, are those of Amsterdam, Antwerp, Hamburg, Cologne, Frankfort, Berlin, Rotterdam, and Dresden, the receipts of the one at Hamburg, for instance, amounting annually, according to the published reports, to between £8000 and £9000. There are also so-called gardens of acclimatization; but these have not much of a scientific character; their professed object, indeed, is not so much the observation of the physiology and constitution of animals as their modification for practical purposes; and practically they are chiefly known as places of recreation, and are not always very successful. The great one in the Bois de Boulogne, now destroyed, out of an expenditure in 1868 of about £7200 showed a deficit of about £1600. A smaller one at the Hague is enabled to pay an annual dividend to its shareholders.

Living collections of plants have great advantages over those of animals; they can be so much more extensively maintained at a comparatively small cost. In several botanical gardens several thousand species have been readily cultivated at a comparatively small cost, and species can be represented by a considerable number of individuals—a great gain, especially where instruction is the immediate object; the lives of many can be watched through several successive generations, and great facilities are afforded for physiological experiments and microscopical observations on plants and their organs whilst still retaining more or less of life. On the other hand, the false data recorded from observations made in botanical gardens have been lamentably numerous and important. A plant in the course of its life so alters its outer aspect that each one cannot be individualized by the keeper of a large collection; and at one period, that of the seed in the ground, it is wholly withdrawn from

his observation: he is therefore obliged to trust to labels; these are often mismatched by accident or by the carelessness of the workmen employed: or, again, one seed has been sown and another has come up in its place, or a perennial has perished and made room for a sucker or seedling from an adjoining species. The misnomers arising from these and other causes have become perpetuated and sanctioned by directors who, for want of adequate libraries or herbaria, or sometimes for want of experience or ability, have been unable to detect them. Plants have also been so disguised or essentially altered by cultivation, that it has become difficult to recognize their identity; and new varieties or hybrids, which, if left to themselves, would have succumbed to some of the innumerable causes of destruction they are constantly exposed to in a wild state, have been preserved and propagated through the protective care of the cultivator, and pronounced at once to be new species. If, moreover, a misplaced label indicates that the seed has been received from a country where no plants of a similar type are known to grow, the director readily notes it as a new genus, and, proud of the discovery, gives it a name and appends a so-called diagnosis to his next seed-catalogue, adding one more to the numerous puzzles with which the science is encumbered. So far, indeed, had this nuisance been carried in several Continental gardens, in the earlier portion of the present century, that, excepting perhaps Fischer and Meyer's and a few other first-rate indexes, the great majority, perhaps nine-tenths, of the new species published in these catalogues have proved untenable; and from my own experience I am now obliged *à priori* to set down as doubtful every species established on a garden-plant without confirmation from wild specimens. Fortunately, the custom is now abating, and directors of botanic gardens are beginning to perceive that they do not add to their reputation by having their names appended to those of bad species.

Living collections of plants, or botanical gardens, are of much older date than zoological ones, and since the sixteenth century have been attached to the principal universities which have medical schools, that of Padua dating from 1525, that of Pisa from 1544, and of Montpellier from 1597. The Jardin des Plantes of Paris, which in botany even more than in zoology so long reigned supreme, was established in 1610, our own first one, at Oxford, in 1632. These university gardens, having been generally more or less under the control of eminent resident botanists, have contributed very largely to the means of studying the structure and affinities of plants, especially in those Continental cities where a milder or more

steady climate has facilitated the maintenance of large collections in the open air or with little protection. Continental gardens have also been long and are still made largely available for the purpose of instruction as well as of scientific experiments, of which the recent labours of Naudin and Decaisne are an excellent illustration. For these scientific purposes the arrangement in large and small square compartments is peculiarly suitable; and I confess that I have frequently had greater pleasure in witnessing the facilities afforded to zealous students in following up, book in hand, the straight rows of scientifically arranged plants in these formal university gardens than in watching the gay crowds that flock to the more ornamentally laid out public botanic gardens.

I do not think that generally much advance has been made of late years in Continental botanical gardens. Those that I first visited in 1830 appeared to me to be but little improved when I again went over them in 1869. Some have acquired additional space, others have paid more attention to ornament; but most of them have remained nearly stationary, and a few have even fallen back. In our own country we have made great progress. Kew Gardens had, indeed, in former days rendered assistance to the investigations of Robert Brown and a few other favoured individuals; but they were the sovereign's private property, and were kept very close, with little encouragement to science at large. But thirty years' unceasing exertions on the part of its distinguished directors, the two Hookers, father and son, have raised them to a point of scientific usefulness far beyond any other establishment of the kind at home or abroad. Of the large sums annually voted for it by Parliament a portion has, indeed, to be applied to mere ornament and to the gratification of visitors; but yet, with all the drawbacks of our climate, and consequent expenditure in houses, a series of named species, representatives of all parts of the globe, far more numerous than had ever been collected in one spot, are there maintained, freely exhibited to the public, and submitted to the examination of scientific botanists.

2. Preserved specimens have the great advantage over living ones that they can be collected in infinitely greater numbers, maintained in juxtaposition, and compared, however distant the times and places at which they had been found; they are often the only materials from which we can obtain a knowledge of the races they represent; although still consisting of individuals only, they can by their numbers give better ideas of species and other abstract groups than the almost isolated living ones; and their careful preservation

supplies the means of verifying or correcting descriptions or delineations which have excited suspicion. Their great drawback is their incompleteness, the impossibility of deriving from them all the data required for the knowledge of a race or even of an individual. It is owing to the frequency with which characters supplied by preserved specimens, although of the most limited and unimportant nature, have been treated as sufficient to establish affinities and other general conclusions which have proved fallacious, that the outcry I have alluded to has been raised against museums and herbaria by those very theorists whose speculations would fall to the ground if all the data supplied by preserved specimens were removed from their foundations.

In respect of these deficiencies, as well as in the means of supplying them, there is a great difference between zoological and botanical museums. Generally speaking, zoological specimens show external forms only, botanical specimens give the means of ascertaining internal structure *; and as a rule the characters most prominently or most frequently brought under the observer's notice acquire in his eyes an undue importance. Hence it is that external form was for so long almost exclusively relied upon for the classification of animals, whilst the minutiæ of internal structure were at a comparatively early period taken account of by botanists; and palæontologists are still led to give absolute weight to the most uncertain of all characters, outline and external markings of deciduous organs. External form, however, is really of far greater importance in animals than in plants; the number, form, size, and proportions of limbs, the shape and colour of excrescences, horns, beaks, feathers, hairs, &c. in animals may be reckoned almost absolute in species when compared with the same characters in the roots, branches, and foliage and, to a certain extent, even in the flowers of plants. In plants, local circumstances, food, meteorological conditions, &c., act readily in modifying the individual and producing more or less permanent races of the lowest degree (varieties); whilst animals in these respects are comparatively little affected, except through those slow or occult processes by which the higher races, species or genera, in all organisms are altered in successive ages or geological periods. Even relative position of external parts, so constant in animals, is less so in plants. Animals being thus definite in outline, and a very

* By *internal structure* is here meant the morphology of internal organs or parts usually included in the comparative anatomy of animals, not the microscopical structure of tissues, which is more especially designated as vegetable anatomy.

large proportion of them manageable as to size, their preserved specimens, carcasses or skins, can be brought together under the observer's eye in considerable numbers, exhibiting at once characters sufficient for the fixation of species, whilst, with a few rare exceptions, a whole plant in its natural shape can never be preserved in a botanical museum. And although good botanical specimens have a general facies often sufficient to establish the species if the genus is known, yet the most experienced botanists have often erred in such determinations where they have been satisfied with external comparison without internal examination.

Identification of species, however, is but a small portion of the business of systematic biology; and for higher purposes, the classification of species, the study of their affinities, the preeminence of ordinary zoological over botanical specimens soon fails. Those characters distinguished by Prof. Flower as adaptive are proportionately more prominent, and the essential ones derived from internal structure are absent; and not only do the former thus acquire undue importance in the student's eyes, but arguments in support of a favourite theory have not unfrequently been founded on distortions really the result of bad preparation, although supposed to be established on the authority of actual specimens, and therefore very difficult to refute. Mounted skins of Vertebrata, showy insects in their perfect stage, shells of Malacozoa, corals, and sponges necessarily form the chief portion of a museum for public exhibition; but science and instruction require a great deal more: museum collections really useful to them should exhibit the animal, as far as possible, in all its parts and in all the phases of its life. This necessity has been felt in modern times, and resulted in the establishment of museums of comparative anatomy, amongst which that of our own College of Surgeons has certainly now taken the lead. But I have nowhere seen, except on a very small scale, the two museums satisfactorily combined: the idea, however, is not a new one; several zoologists have expressed their opinions on the desirableness of such an arrangement, which it is hoped will be duly considered in the formation of the new National Zoological Museums about to be erected at South Kensington for the double purposes of exhibition and science. The requirements of the gazing public are sure to be well provided for; and there is every reason to believe that the exertions of scientific zoologists will not have proved useless,—that we shall, in the portion devoted to science and instruction, see the skins of Vertebrata preserved without the artist's distortion, accompanied, as far as practicable, by corresponding

skeletons and anatomical preparations, as well as by the nests and eggs of the oviparous classes—insects with their eggs, larvæ, and pupæ, shells with the animals which produce them, &c.,—always with the addition, as far as possible, of the collectors' memoranda as to station, habit, &c., in the same manner as herbarium specimens are now frequently most usefully completed by detached fruits, seeds, young plants in germination, gums, and other products.

Here, however, will arise another source of false data, to be carefully guarded against—the mismatching of specimens, which in botany has probably produced more false genera and species than the misplacing of garden labels. The most careful collectors have in good faith transmitted flowers and fruits belonging to different plants as those of one species, the fruits perhaps picked up from under a tree from which they were believed to have fallen—or two trees in the same forest, with similar leaves, the one in flower, the other in fruit, supposed to be identical, but in fact not even congeners; and the mismatching at the various stages of drying, sorting, distributing, and finally laying in the specimens have been lamentably frequent. Collectors' memoranda, if not immediately attached to the specimens, or identified by attached numbers, have often led the naturalist astray; for collectors are but too apt, instead of noting down any particulars at the time of gathering, to trust to their memory when finally packing up their specimens. And so long as reasoning by analogy was never allowed to prevail over a hasty glance at a specimen and the memoranda attached to it, false genera and species arising from these errors were considered indisputable. *Magallana* of Cavanilles was till recently allowed materially to invalidate the character of Tropæoleæ, overlooking the strong internal evidence that it was founded upon the fruit of one natural order carelessly attached to a poor flowering specimen of another.

Zoological museums and botanical herbaria differ very widely in the resources at their disposal for formation, maintenance, and extension of their collections. Zoological museums are by far the most expensive, but, on the other hand, as exhibitions they can draw largely on the general public, whilst herbaria must rely mainly upon science alone, which is always poor; both, however, may claim national assistance on the plea of instruction as well as of pure science: and for practical or economic purposes the herbarium is even more necessary than the museum. The planning the new museums so as best to answer these several purposes for which they are required, has, I understand, engaged the attention of the Royal

Commission on scientific instruction and the advancement of science, and our most eminent zoologists have been consulted; any further observations on my part would therefore be superfluous. If our Government fail in their arrangements for the promotion of science, it will not be for want of having its requirements fully laid before them.

I am unable to say what progress has been made of late years in Zoological Museums; my notes on Continental ones were chiefly taken between the years 1830 and 1847, and would therefore be now out of date. It would, however, be most useful if some competent authority would undertake a tour of inspection of the more important ones, as in the great variety of their internal arrangements many a useful practical hint might be obtained; and we much want a general sketch of the principal Zoological and Botanical collections accessible to science, showing in what branch each one is specially rich, and where the more important typical series are now respectively deposited. In Herbaria a few changes have recently taken place, which it may be useful to record. Paris (I mean, of course, the brilliant Paris of a twelvemonth back) had lost considerably. Of the many important private herbaria I had been familiar with in earlier days, two only, those of Jussieu and of A. de St.-Hilaire, had been secured for the national collection; Webb's had gone to Florence; J. Gay's, which would have been of special value at the Jardin, was allowed to be purchased by Hooker, and presented by him to Kew. The celebrated herbarium of Delessert is removed to Geneva, whilst his botanical library, one of the richest in existence, is locked up within the walls of the Institut. These are but partially replaced by M. Cosson's herbarium, which has much increased of late years, and to which he added last spring the late Schultz Bipontinus's collections, rich in Compositæ. The national herbarium of the Jardin des Plantes is still one of the richest, but no longer *the* richest of all. The limited funds at the disposal of the Administration have allowed of their making but few acquisitions; their staff is so small and so limited in the hours of attendance that the increase of the last twenty years remains for the most part unarranged; and their library is most scanty. Science has been out of favour with their Governments of display. It would be out of place for me here to dwell upon the painful feelings excited in my mind by the dreadful ordeal through which a country I have been so intimately associated with for more than half a century is now passing, feelings rendered so acute by the remembrance of the uniform kindness I have received from private friends, as well as from

men of science, from Antoine Laurent de Jussieu and his colleagues to the eminent professors of the Jardin, who have now passed through the siege, that I may be allowed to express an anxious hope that when the crisis is passed, when the elasticity of French resources shall have restored the wonted prosperity, the new Government may at length perceive that, even politically speaking, the demands of science require as much attention as popular clamour.

The Delessertian herbarium has been well received at Geneva, where it has been adequately deposited in a building in the Botanical Garden, very near to the Natural-History Museum now erecting. At Paris it had been for some time comparatively useless, owing to the attempt to class it according to Sprengel's Linnæus; but now an active amateur committee, Messrs. Jean Mueller, Reuter, Rapin, and others, under the presidency of Dr. Fauconnet, have already made great progress in distributing the specimens under their natural Orders: and Geneva, already containing the important typical collection of De Candolle, as well as Boissier's stores rich especially in Mediterranean and Oriental plants, has become one of the great centres where real botanical work can be satisfactorily carried on; and as she has had the good sense to level her fortifications, she may accumulate national treasures with more confidence in the future. Munich had lost much of the prospects she had; the Bavarian Government failed to come to terms with the family of the late Von Martius: his botanical library has been dispersed, and his herbarium removed to Brussels, where it is to form the nucleus of a national Belgian collection. At Vienna the Imperial herbarium is now admirably housed in the Botanic Garden, and is in good order, with the great advantage of a rich botanical library in the same rooms. At Berlin, where the Royal herbarium, like the zoological museums, has always been kept in very excellent order, want of space is greatly complained of since it has been transferred to the buildings of the University. At Florence, as we learn from the 'Giornale Botanico Italiano,' the difficulties with regard to the funds left by Mr. Webb for the maintenance of his herbarium have been overcome; and it is to be hoped that the liberal intentions of the testator, who made this splendid bequest for the benefit of science, will no longer remain so shamefully unfulfilled. To the above six may be added Leyden, Petersburg, Stockholm, Upsala, and Copenhagen as towns possessing national herbaria sufficiently important for the pursuit of systematic botany; but when I visited them, now many years since, they were all more or less in arrear in arrangement. I know not how far they may have since improved. In the United States of

America, the herbarium of Asa Gray, recently secured to the Harvard University, now occupies a first rank. That of Melbourne in Australia, founded by Ferdinand Mueller, has, through his indefatigable exertions, attained very large proportions; and that of the Botanical Garden of Calcutta, under the successive administrations of Dr. Thomson and the late Dr. T. Anderson, had recovered in a great measure its proper position, which I trust it will henceforth maintain. Our own great national herbarium and library at Kew is now far ahead of all others in extent, value, and practical utility; originally created, maintained, and extended by the two Hookers, father and son, their unremitting and disinterested exertions have succeeded in obtaining for it that Government support without which no such establishment can be rendered really efficient, whilst their liberal and judicious management has secured for it the countenance and approbation of the numerous scientific foreigners who have visited or corresponded with it. Of the valuable botanical materials accumulated in the British Museum during the last century, I say nothing now; for the natural-history portion of that establishment is in a state of transition, and my own views as regards botany have been elsewhere expressed. I have only to add that we have also herbaria of considerable extent at the Universities of Oxford, Cambridge, and at Edinburgh, and at Trinity College, Dublin, and to express a hope that the necessity of maintaining and extending them will be duly felt by those great educational bodies, if they desire to secure for their Professorial chairs botanists of eminence.

3. Pictorial representations or drawings have the advantage over Museum specimens that they can be, in many respects, more complete; they can represent objects and portions of objects which it has been impossible to preserve; they can give colour and other characters lost in the course of desiccation; they preserve anatomical and microscopical details in a form in which the observer can have recourse to them again and again without repeating his dissections; and although, like a Museum specimen, each drawing represents usually an individual, not a species, yet that individual can by exact copies be multiplied to any extent for the simultaneous use of any number of naturalists; whilst specimens of the same species in different museums are corresponding only, not identical, and imperfect comparison and determination of specimens supposed to be authentic (*i. e.* exactly corresponding to the one originally described) have led into numerous errors. Drawings, moreover, by diagrams and other devices, can represent more or less perfectly the abstract

ideas of genera and species; they can exhibit the generic or specific characters more or less divested of specific or individual peculiarities.

Drawings, on the other hand, are, much more than specimens, liable to imperfections and falsifications, arising from defective observation of the model and want of skill in the artist; and errors thus once established are much more difficult of correction than even those conveyed by writing. A pictorial representation conveys an idea much more rapidly and impresses it much more strongly on the mind than any detailed accompanying description by which it may be modified or corrected, and is but too frequently the only evidence looked into by the more theoretical naturalist. This is especially the case with microscopical and anatomical details of the smaller animals and plants, the representations of which, if very elaborate and difficult to verify, usually inspire absolute confidence. Drawings are also costly, often beyond the means of unaided science, who here, again, as in the case of gardens and museums, is obliged to have recourse to the paying public: the public in return require to have their tastes gratified; artistic effect is necessarily considered, thus increasing the cost, and removing the pictures still further from the reach of the working biologist. It appears to me that collections of drawings systematically arranged have not generally met with that attention which they require from Directors of Museums, and that their multiplication in an effective and cheap form ought to be a great object on the part of governments, scientific associations, and others who contribute pecuniarily to the advancement of science.

To be effective, the first requisites in a zoological or botanical drawing are accuracy and completeness; it is a faithful representation, not a picture, that is wanted. Many a splendid portrait of an animal or plant, especially if grouped with others in one picture, has been rendered almost useless to science by a graceful attitude or an elegant curve which the artist has sought to give to a limb or to a branch; and those analytical details which are of paramount importance to the biologist are neglected because they spoil the general effect. We next require from an illustration as from a description that it should be representative or to a certain degree abstract; and this requires that the artist, if not himself the naturalist, should work under the naturalist's eye, so as to understand what he delineates. Great care should be taken to select for the model an individual in a normal state as to health, size, &c., and in the selection and arrangement of the anatomical details, so as to represent the race rather than the individual—all of which requires a thorough acquaintance with the questions to be attended to. It

is true that the artist, working independently and copying mechanically, may serve as a check on the naturalist, who in minute microscopic examinations may be apt to see too much in conformity to preconceived theories; but that is not often the case: the most satisfactory analytical drawings I have always found to be those made by the naturalist's own hand, and I have long felt how much my own inability to draw has detracted from the value of the botanical papers I have published. And, thirdly, when we consider that the great advantage of an illustration over a description is that the one gives us at a glance the information which we can only obtain from the other by study, we require that each drawing or plate should be as comprehensive as is consistent with clearness and precision. Outline drawings, or portraits without structural details, often omit the essential characters we are in search of: where details are unaccompanied by a general outline, we miss a great means of fixing their bearing on our own minds. Structural details may also equally err in being too numerous or too few, on too large or on too small a scale. If the plate is crowded with details of little importance, or which may be readily taken from the general outline, they draw off the attention from those which it is essential should be at once fixed on the mind: and if enlarged beyond what is necessary for clearness, they require so much the more effort to comprehend them, unless, indeed, they are destined to be hung up on the walls of the lecture room. I believe it to be the case with some drawings of the muscles of vertebrata, or of the internal structure of insects, as I know it to be with those of ovules and other minute parts of flowers of the late Dr. Griffith and others, that, with their very high scientific value, their practical utility is much interfered with by the large scale on which they are drawn. A great deal depends also on the arrangement in the plate, always keeping in mind that the object is not to please the eye, but to convey at one view as much as possible of comparative information without producing confusion.

Biological illustrations in general have much improved in our time. It is true that some of the representations of animals and plants dating from the middle of last century will enter into competition with any modern ones as to general outline and facies; but analytical details were almost universally neglected, and colouring, when attempted, was gaudy and unfaithful. At present, I believe, we excel in this country in the general artistic effect, as, unfortunately also for the naturalist, in the costliness of our best zoological and botanical plates; the French are remarkable for the selection,

arrangement, and execution of the scientific details (and as a model I may refer to some of the publications of the Paris Museum, such as the 'Malpighiaceæ' of Adrien de Jussieu), and also for the excellent woodcuts illustrating their general and popular works; the Germans and some Northern States for the admirable neatness of microscopic and other minutiæ executed at a comparatively small cost, owing partially, at least, to the use of engraving on lithographic stone.

4. Written descriptions are what we most chiefly rely upon to convey to the general or to the practical naturalist the results of our studies of animals and plants; but descriptions are of two kinds, individual descriptions and descriptions of species, genera, or other races. The former are, like preserved specimens or delineations, materials for study; like them they require in their preparation little more than artistical skill, guided by a general knowledge of the subject: but abstract descriptions, whether specific or relating to races of a higher degree, require study of the mutual relations of individuals and races and their consequent classification which constitute the science of systematic biology; and this distinction should be constantly kept in view for the just appreciation of all descriptive works. Any tyro can with care write a long description of a specimen unimpeachable as to accuracy; but it requires a thorough knowledge of the subject, and a keen appreciation of the bearing of the points noticed, to prepare a good description of a species. For the latter to be serviceable it must be accurate; it must be full without redundancy; it must be concise without sacrificing clearness; it must be abstractive, not individual; and lastly, the most difficult qualification of all, and that which constitutes the main point of the science, the abstraction must be judicious and true to Nature.

The paramount importance of accuracy is too evident to need dwelling upon. We are all liable to errors of observation. Imperfect vision or instruments, optical deceptions, accidentally abnormal conditions of the specimen examined, hasty appreciation of what we see from preconceived theories are so many of the causes which have occasionally led into error the most eminent of naturalists, and require to be specially guarded against by repeated observation of different specimens, and constant testing at every step by reasonings from analogy. Errors once established on apparently good authority are exceedingly difficult to correct, and have been the source of many a false theory. Where loose examination and hasty conclusions have been frequently detected, we can at once renounce all confidence in an author's descriptions, in his genera and species, un-

less confirmed from other sources; but an accidental oversight on the part of a naturalist of established reputation is the most difficult to remedy, notwithstanding the eagerness with which some beginners devote themselves to hunting them out. No botanist was, I believe, ever more careful in verifying his observations over and over again, and in submitting them to the tests supplied by the extraordinary methodizing powers of his mind, than Robert Brown; no one has ever committed fewer of what we call blunders, or established his systematic theories on safer ground; yet even he has been detected in a few minor oversights, eagerly seized upon by a set of modern speculative botanists, lovers of paradoxes, as justifying them in devoting their time and energies to the disputal of several of his more important discoveries and conclusions.

The value of a description as to fulness and conciseness is practical only, but in that point of view important. A description, however accurate, is absolutely useless if the essential points are omitted, and very nearly so if those essential points are drowned in a sea of useless details. The difficulty is to ascertain what are the essential points,—and hence one of the causes of the superiority of Monographs and Floras over isolated descriptions, such as those of Zoologies and Botanies of Exploring Expeditions, which I insisted on in my Address in 1862: in the former the author must equally examine and classify all the allied races, and thus ascertain the essential points; in the latter case he is too easily led to trust to what he believes to be essential. My own long experience in the using as well as in the making of botanical descriptions has proved to me how difficult it is to prepare a really good one, how impossible to do it satisfactorily from a first observation of a single specimen. However carefully you may have noted every point that occurs to you, you will find that after having comparatively examined other specimens and allied forms you will have many an error to correct, many a blank to fill up, and much to eliminate. I have had more than once to verify the same species in two authors, the one giving you a character of a few lines which satisfies you at once, the other obliging you to labour through two or three quarto pages of minute details from which, after all, some of the essential points are omitted.

But the great problem to be solved at every stage in systematic or descriptive biology, and that which gives it so high a scientific importance, is the due detection and appreciation of affinities and mutual relations; and in this respect the science has made immense progress within my own recollection, and especially during the last few years. The gradual supplanting of artificial by natural classi-

fications has been too often commented upon to need repetition. It is now, I believe, universally admitted that a species is the totality of the individuals connected together by certain resemblances or affinities the result of a common descent. It is also acknowledged that for scientific purposes these species should be arranged in groups according to resemblances or affinities more remote than in the case of species, although here commences the great difference of opinion as to the meaning of these remoter affinities, whether they also are the result of a common descent, or of that supposed imitation of a type which I have above alluded to. For those, however, who have once connected affinity with consanguinity, it is difficult to recede from so ready an explanation of those mysterious resemblances and differences the study of which must be the ruling principle to guide us in our classifications. All this has now been fully explained by more able pens than mine; my only object in repeating it is to point out clearly the need of treating all systematic groups, from the order down to the genus, species, or variety, as races of a similar nature, collections of individuals more nearly related to each other than to the individuals composing any other race of the same grade, and of abolishing the use of the expression type of a genus or other group in any other than a purely historical sense as a question of nomenclature*. If a genus has to be divided, our laws of nomenclature require the original name to be retained for that section which includes the species which the founder of the genus had more specially observed in framing his character; and therefore, and for that reason only, it becomes necessary to inquire which was or which were the so-called typical species—the biologist's (or, as it were, the artist's), not Nature's type.

Without repeating what I have often said of the comparative value of Monographs and Faunas or Floras over miscellaneous descriptions, I may observe that the immense progress made in the accumulation of known species henceforth diminishes still more the relative importance to science of the addition of new forms when compared with the due collocation and correct appreciation of those already known. Much has been done of late years in the latter respect; but yet some branches of biology, and perhaps entomology more than any other, are very much in arrear as to supplying us with

* For the purposes of instruction some one species is often named as *a* type of a genus—that is to say, as fairly representing the most prevalent characters; but to prevent any confusion with *the* imaginary type, it would surely be better to call it an *example*, as, indeed, is often done. In geographical biology the word type is used again in another sense, which, however, does not lead to any misunderstanding.

available data for investigating the history of species and their genealogy, their origin, progress, migrations, mutual relations, their struggles, decay, and final extinction. It is to be feared that in insects, as in plants, but too large a proportion of the innumerable genera and subgenera have been founded rather on the sortings of a collector than on the investigation of affinities; and, indeed, that must in a great measure be the case so long as a large number are only known from their outward form at one period only of their varied phases of existence.

The days of a 'Systema Naturæ' or single work containing a synopsis of the genera and species of organized beings are long since passed away. Even a 'Species Plantarum,' now that their number at the lowest estimate exceeds 100,000, has become almost hopeless. The last attempt, De Candolle's 'Prodromus,' has been nearly forty years in progress; the first portion has become quite out of date; and all we can hope for is that it may be shortly completed for one of the three great classes. Animals might have been more manageable, were it not for the insects. Mammalia estimated at between 2000 and 3000 living species, Birds at about 10,000, Reptiles and Amphibia under 2000, Fishes at about 10,000, Crustacea and Arachnida rather above 10,000, Malacozoa about 20,000, Vermes, Actinozoa, and Amorphozoa under 6000, would each by themselves not impose too heavy a tax on the naturalist experienced in that special branch who should undertake a scientific classification and diagnoses of all known species; and in one important branch, the Fishes, this work has been most satisfactorily carried out in Dr. Günther's admirable genera and species of all known Fishes, published under the misleading title of 'Catalogue of the Fishes in the British Museum,' and recently completed by the issue of the eighth volume. The sound philosophical views expressed in his preface to that volume (which, by some strange inversion, bears a signature not his own) can be appreciated by us all; and zoologists are all agreed as to the care with which they have been worked out in the details. Insects are, however, the great stumbling-block of zoologists; the number of described species is estimated by Gerstäcker at about 160,000, viz. Coleoptera 90,000, Hymenoptera 25,000, Diptera 24,000, Lepidoptera 22,000–24,000. Mr. Bates thinks that, for the Coleoptera at least, this estimate is too high by one-third; but even with that deduction the number would exceed that of plants, and it is probable that the number of as yet undiscovered species in proportion to that of the described ones is far greater in the case of insects than in plants. We can therefore no longer hope for a 'Genera and Species'

death by Keferstein and others, which I mentioned in my Address of 1866, has advanced but slowly. The Amorphozoa, Actinozoa, and Malacozoa, forming the first two volumes, were then completed; and Gerstäcker has since been proceeding with the Arthropoda, commencing with the Crustacea, for the third volume, of which only the general matter and the Cirripedia and Copepoda are as yet published; and three or four parts of a sixth volume for Birds have been issued by Selenka, treating the anatomical and other general matter in great detail. Another general work of merit, although on a smaller scale, has been proceeding as slowly. Of Carus and Gerstäcker's 'Handbuch der Zoologie,' the second volume, containing the Arthropoda, Malacozoa, and lower animals, had been already published in 1861; and to this was added, in 1868, the first half of the Vertebrata for the first volume, with a promise that the remainder should appear in the autumn, but which has not yet been fulfilled. Among the other recently published systematic zoological handbooks of which I have had memoranda as published in various Continental states, the most important are said to be:—Harting's, published at Tiel in the Netherlands, of which, up to 1870, only three volumes had appeared, containing the Crustacea, Vermes, Malacozoa, and lower animals; A. E. Holmgren's Swedish 'Handbok i Zoologi,' of which Mammalia were published in 1865 and Birds in 1868-71; and Claus's 'Grundzüge' and Troschel's 'Handbuch' (7th edition) for University teaching in Germany.

In a comparative sketch of the more partial Monographs, Faunas, and Floras, I had wished to direct my attention more especially to the means afforded us of comparing the plants and animals of different countries; and with this view one of the questions I addressed to foreign zoologists was, "What works or papers are there in which the animals (of any of the principal classes) of your country are compared with those of other countries?" The answers to this query have not been generally satisfactory. Where the zoology has been well investigated, we have popular handbooks, elaborate memoirs, and works of high scientific value or splendidly illustrated. But short synoptical faunas, so useful to the general naturalist, and corresponding to the Floras we now possess of so many different countries, are very few; the statement of the general geographical range of each species, so prominent a feature in many modern Floras, is still less thought of; and indications of allied or representative races in distant countries are equally rare. We have, indeed, several excellent essays on the geographical distribution of animals (I had occasion to allude to several of them in my Address of 1869); but

with spirit, as evidenced by such names as Holmgren, Kinberg, Liljeborg, Malm, Malmgren, G. O. Sars, Stål, Thorell, and others in Zoology, and Agardh, Andersson, Areschoug, Fries, Hartmann, and others in Botany. Two of the Academies to whose publications Linnæus contributed, those of Upsala and Stockholm, continue to issue their Transactions and Proceedings; and to these are now added the memoirs published by the University of Lund. They lost Linnæus's own collections; and the Zoological Museum at Upsala, when I saw it many years since, was poor; that of Stockholm better, and in excellent order. In the Herbaria, Thunberg's and Afzelius's collections are deposited at Upsala, and Swartz's at Stockholm, where the Herbarium of the Academy of Sciences has been of late years considerably increased under the care of Dr. Andersson.

The Scandinavian Fauna and Flora have been generally well investigated. The numerous Floras published of late years show considerable attention on the part of the general public. I observe that Hartmann's Handbook is at its tenth edition: Andersson has published 500 woodcut figures of the commoner plants, taken chiefly from Fitch's illustrations of my British Handbook; and my lists contain many papers on Swedish Cryptogams. The relation of the Scandinavian vegetation to that of other countries has also been specially treated of by Zetterstedt, who compared it with that of the Pyrenees—and by Areschoug, Andersson, Ch. Martins, and others, as alluded to in more detail in my Address of 1869. Many works have succeeded each other on the Vertebrate Fauna since the days of Linnæus; amongst which those of Liljeborg as to Vertebrata in general and of Sundevall as to Birds are still in progress. The Crustacea, Mollusca, and lower animals have been the subjects of numerous papers, the marine and freshwater faunas having been more especially investigated by the late M. Sars and by G. O. Sars; and Th. Thorell, in the Upsala Transactions, has given an elaborate review of the European genera of Spiders, evidently a work of great care, preceded by apposite remarks on their generic classification, and a general comparison of the Arachnoid faunæ of Scandinavia and Britain, all in the English language although published in Sweden. This work, however, does not extend to species, beyond naming a type (by which I trust is meant an example, not the type) of each genus; nor is the geographical range of the several genera given. There appears to be no general work on Scandinavian Insects.

The Fauna and Flora of Spitzbergen have specially occupied Swedish naturalists. To the accounts of the Vertebrata by Malmgren, and of the Lichens by T. M. Fries, have now been added, in

produce, of the cessation of one race and the substitution of another without apparent physical cause, the Russian, even without travelling out of his own country, can contribute, more than any other observer, valuable materials for the general history of races. In Botany I have on former occasions referred to Ledebour's 'Flora Rossica' as the most extensive complete Flora of a country which we possess, and to the numerous papers by which it has been supplemented. Several of these are still in progress, chiefly in the Bulletin of the Society of Naturalists of Moscow; and I have notes of local Floras, and lists from various minor publications. The last received volume of the Memoirs of the Academy of St. Petersburg includes the botanical portion of Schmidt's travels in the Amur-land and Sachalin, in which the geographical relations of the flora are very fully treated of—and the first part of a very elaborate 'Flora Caucasi' by the late F. J. Ruprecht, which may be more properly designated Commentaries on the Caucasian Plants than a Flora in the ordinary sense of the word. It is an enumeration of species, with frequent observations on affinities, and a very detailed exposition of stations in the Caucasus, but without any reference to the distribution beyond that region; above 300 large 4to pages only include the Polypetalæ preceding Leguminosæ; and the lamented death of the author will probably prevent the completion of the work. N. Kaufmann, Professor of Botany at the University of Moscow, an active botanist of great promise, whose death last winter is much deplored by his colleagues, had published a Flora of Moscow in the Russian language, which had met with much success. In the zoology of Russia the most important recent work is Middendorff's 'Thierwelt Sibiriens,' analyzed in the 'Zoological Record,' vi. p. 1, which, with the previously published descriptive portion and the botany of the journey by Trautvetter, Ruprecht, and others, forms a valuable exposition of the biology of N.E. Siberia, a cold and inhospitable tract of country, where organisms, animal as well as vegetable, are perhaps poorer in species and poorer in individuals than in any other region of equal extent not covered with eternal snows. Middendorff's observations on this poverty of the fauna of Siberia, its uniformity and conformity to the European fauna, on the meaning to be given to the species, on their variability and on the multiplicity of false ones published, on the complexity of their respective geographical areas, on their extinction and replacement by others, &c. are deserving of the careful study of all naturalists. L. v. Schrenck's Mollusca of the Amur-land or Mantchuria (reviewed in the 'Zoological Record,' iv. p. 504) is equally to be recommended for the manner in which the

with those of adjoining regions. This has been done for plants. The Swiss flora has been well worked up both by German and by French botanists; it is included in Koch's Synopsis and some other German Floras. De Candolle and other writers on the French flora had to introduce a large portion of the Swiss vegetation; and the compilers of the rather numerous Swiss Floras and Handbooks* have generally followed either the one or the other, so that there remains but little difficulty in the identification of Swiss botanical races; but here, as elsewhere, methodical Faunas of the country are much in arrear. I have the following notes from M. Humbert of what has been published in this respect during the last three years.

V. Fatio, 'Faune des Vertébrés de la Suisse,' 8vo, vol. i. Mammifères, 1869 (reported on in 'Zoological Record,' vi. p. 4): the second volume, Reptiles, Batrachia, and Fishes, to appear in the course of the present year, the 3rd and 4th vols. (Birds) to follow. "This Fauna is the first which has been published on the Vertebrata of Switzerland. Hitherto there had only been partial and incomplete Catalogues. The species are carefully described; and there are numerous notes on their distribution and habits, from the author's observations made in all the Swiss collections and in the field. There are also interesting historical details upon certain animals which have more or less completely disappeared from Swiss territory, such as the stag, the roebuck, and the wild boar, as also on the mammifers whose remains have been found in recent deposits." G. Stierlin and V. de Gautard, "Fauna Coleopterorum Helvetica," in the Nouveaux Mémoires of the Helvetic Society, xxiii. and xxiv., a catalogue with stations and often limits in altitude, supplementing Heer's 'Fauna

* In the list of publications of the last three years only, sent me by M. A. de Candolle, are the following new Swiss Botanical Handbooks:—J. C. Ducommun, 'Taschenbuch für den schweizerischen Botaniker,' 1 vol. 8vo, of 1024 pages, with some analytical woodcuts: few details on stations. R. T. Simler, 'Botanischer Taschenbegleiter des Alpenclubisten,' 1 vol. 12mo, 4 plates: alpine species only. Tissière (late Canon of St. Bernard, now deceased), 'Guide du Botaniste au Grand St.-Bernard,' 1 vol. 8vo: a catalogue with detailed localities. J. Rhiner, 'Prodrom der Waldstädter Gefässpflanzen,' 1 vol. 8vo: a catalogue with details as to localities. Morthier, 'Flore analytique de la Suisse,' 1 vol. 18mo: imitated from an older German 'Excursions-Flora fur die Schweiz,' by A. Gremli. A new (3rd) edition of L. Fischer's 'Flora von Bern' and Fischer-Ooster's 'Rubi Bernenses;' the latter work, together with some contributions to the Swiss Flora of A. Gremli, adding 98 pages to the volumes of Batological literature we already possess, without advancing a step either in giving us a clear notion of what is a species of Bramble, or in facilitating our naming those we meet with, unless in the precise localities indicated by the several authors.

of papers on the zoology of the same district or of the Canton de Vaud, inserted in the Bulletin of the Société Vaudoise of Natural History, and of others on the zoology of other districts, from various other Swiss Transactions, all of which are noticed in our 'Zoological Record,' vols. v. and vi. To these must be added J. Saratz's "Birds of the Upper Engadin," from the 2nd volume of the Bulletin of the Swiss Ornithological Society, 1870. "The valley of the Upper Engadin commences at 1860 metres above the level of the sea, and ends at 1650 metres, where commences the Lower Engadin. The list, therefore, given by M. Saratz includes no point situate below that elevation. He classes the birds of this valley and of the mountains which enclose it into:—1, sedentary birds; 2, birds which breed in the Upper Engadine, but do not spend the winter there; and 3, birds purely of passage. He enumerates 144 species, and gives upon every one notes of its station, times of passage, abundance or rarity, &c."

Meyer-Dür has a short note in the 'Mittheilungen' of the Swiss Entomological Society (iii. 1870) on certain relations observed between the insect-faunas of Central Europe and Buenos Ayres—a question worthy perhaps of some consideration in connexion with the above-mentioned coincidence of a Chilian and East-Mediterranean *Geum*, and a very few other curious instances of identical or closely representative species of plants in the hot dry districts of the East Mediterranean, the central Australian, and the extratropical South-American regions.

Swiss naturalists continue their activity in various branches of biology. E. Claparède's very valuable memoirs on Annelida Chætopoda and on Acarina have been fully reported on in the 'Zoological Record,' as well as Henri de Saussure's entomological papers, which have been continued in the more recently published volumes of the Memoirs of the Société de Physique of Geneva and of the Swiss Entomological Society. In Botany, since I last noticed De Candolle's 'Prodromus,' the 16th volume has been completed by the appearance of the first part, containing two important monographs—that of Urticaceæ, by Weddell, and of Piperaceæ by Casimir de Candolle, together with some small families by A. de Candolle and J. Müller. The social disturbances of the last twelvemonth have much delayed the preparation of the 17th volume, which is to close this great work; but it is hoped that it will now be shortly proceeded with. Of Boissier's 'Flora Orientalis,' mentioned in my Address of 1868, the second volume is now in the printer's hands. Dr. G. Bernouilli, who had resided some time in Central America, has published, in the

to acquire a name in the pursuit of natural science after emerging from the barbarism of the middle ages; and although she has since been more devoted to art, and has allowed several of the more northern states far to outstrip her in science, she has still, amidst all her vicissitudes, produced a fair share of eminent physiologists as well as systematic zoologists and botanists; and within the last few years the cultivation of biology appears to have received a fresh impulse. It is only to be hoped that it may not be seriously checked by local and political intrigues, which appear to have succeeded, in one instance at least, in conferring an important botanical post on the least competent of the several candidates. Amongst the various publishing academies and associations mentioned in my Address of 1865, the Italian Society of Natural Sciences at Milan contains a considerable number of papers on Italian zoology; and a few others in zoology and palæontology are scattered over the publications of the Academies of Turin and Venice and of the Technical Institute of Palermo. From the lists I have received, there appear to have been recent catalogues of Sicilian and Modenese Birds by Doderlein in the Palermo Journal, of Italian Araneida and Modenese Fishes by Canestrini in the Milanese Transactions, and of Italian Diptera, commenced by Rondani in the Bulletin of the Italian Entomological Society. Malacology, so peculiarly important in the study of the physical history of the Mediterranean region, has produced numerous papers, chiefly in the Milanese Transactions, and in Gentiluomo's 'Bullettino Malacologico' and 'Biblioteca Malacologica,' published at Pisa. I also learn that at the time of the decease of the late Prof. Paolo Savi, in the beginning of April, the manuscript of his 'Ornitologia Italiana' was complete, and had just been placed in the printer's hands.

In Botany, Parlatore's elaborate 'Flora Italiana' has continued to make slow progress. We have received up to the 2nd part of the 4th volume, reaching as far upward as Euphorbiaceæ, having commenced with the lower orders. The old Journal of Botany ceased with the year 1847, as I presumed to have been the case when I mentioned it in 1865, and has since been replaced by a 'Nuovo Giornale Botanico Italiano,' which continues, with tolerable regularity, issuing four parts in the year, the last received being the 2nd of the third volume. The most valuable of the systematic papers it contains are Beccari's descriptions of some of his Bornean collections. Delpino, well known for his interesting dichogamic observations, as well as for some rather imaginative speculations, has also contributed to systematic botany a monograph of Marcgraaviaceæ, but,

unfortunately, without sufficient command of materials for the compilation of a useful history of that small but difficult group, and with a useless imposition of new names to forms which he thinks may have been already published, but has not the means of verifying. De Notaris, under the auspices of the municipality of Genoa, has published a synopsis of Italian Bryology, forming a separate octavo volume of considerable bulk.

Of the other two great European peninsulas I have little to say, notwithstanding their great comparative biological importance. The Western or Iberian peninsula is the main centre of that remarkable Western flora to which I specially alluded in 1869, and which, more perhaps than any other, requires comparison with entomological and other faunas. But Spain is sadly in arrear in her pursuit of science. With great promise in the latter half of the last century, and certainly the country of many eminent naturalists, especially botanists, she has now for so long been subject to chronic pronunciamentos that she leaves the natural riches of her soil to be investigated by foreigners. Willkomm and Lange's 'Prodromus Floræ Hispanicæ,' which, when I last mentioned it, was in danger of remaining a fragment, has since been continued, and, it is hoped, will shortly be completed by the publication of one more part. I have no notes on any recent zoological papers beyond Steindachner's Reports on his Ichthyological tour in Spain and Portugal, and the Catalogues of the Zoological Museum of Lisbon publishing by the Lisbon Academy of Sciences. The Eastern peninsula, Turkey and Greece, with the exception of some slight attempts at Athens, has no endemic biological literature, and, with its present very unsatisfactory social state, affords little attraction to foreign visitors. The Levant, in respect of botany at least, has been much more fully investigated; but there, as in Turkey, much yet remains to be done; and pending the issue of Boissier's second volume already mentioned, I know of nothing of any importance in the biology of the East Mediterranean region as having been worked out within the last two or three years. As an hiatus, however, and yet a link between the Indian and the European floras and faunas, it will amply repay the study to be bestowed upon it by future naturalists.

VII. France.

France, without any special endemic character, unites within her limits portions of several biological regions, thus requiring from her naturalists the study of all the European floras and faunas in order rightly to understand her own. The greater part of her surface

constitutes the western extremity of that great Russo-European tract I have above commented upon, its flora, and probably also its fauna, here blending with the West-European type, which spreads more or less over it from the Iberian peninsula. To the south-east she has an end of the Swiss Alps, connected to a certain degree with the Pyrenees to the south-west by the chain of the Cevennes, but at an elevation too low, and which has probably always been too low, for the interchange of the truly alpine forms of those two lofty ranges. South of the Cevennes she includes a portion of the great Mediterranean region; and the marine productions of her coasts are those of three different aquatic regions—the North Sea, the Atlantic, and the Mediterranean. The few endemic or local races she may possess appear to be on those southern declivities which bound the Mediterranean region; and if the volcanic elevations of Central France have a special interest, it is more from the absence of many species common at similar altitudes in the mountains to the east or to the south-west, than from the presence of peculiar races not of the lowest grades, with the exception, perhaps, of a very few species now rare, and which may prove to be the lingering remains of expiring races.

With so many natural advantages, French science, represented during the last two centuries by as great, if not a greater number of eminent men than any other country, has long felt the necessity of a thorough investigation of the biological productions of her territory. The French Floras, both general and local, are now numerous, and some of them excellent. The geographical distribution of plants in France has also been the subject of various essays as well as separate works. It is only to be regretted that in the Floras themselves the instructive practice of indicating under each species its extra-Gallican distribution has not yet been adopted. In zoology, no general fauna has been attempted since De Blainville's, which was never completed; and none is believed to be even in contemplation; but I have a long list of partial Faunas and memoirs on the animals of various classes of several French departments; and Rey and Mulsant are publishing, in the Transactions of two Lyons Societies, detailed monographs of all French Coleoptera.

The progress of French naturalists in Biology in general up to 1867 has been fully detailed as to zoology by Milne-Edwards, in his 'Rapport sur les Progrès de la Zoologie en France;' and as to Systematic Botany by Ad. Brongniart in his 'Rapport sur les Progrès de la Botanique Phytographique.' The recent progress as to both branches, as well as in regard to other natural sciences, has also

been reviewed by M. Emile Blanchard in his annual Addresses to the Meetings of the Delegates of French Scientific Societies, held every April at the Sorbonne from 1865 to 1870. The Société Botanique de France had also up to that time been active, and the publication of its proceedings brought down nearly to the latest meetings. I am compelled, however, for want of time, to defer some details I had contemplated relating to the recent labours of French biologists; but I cannot refrain from inserting the following note on a work mentioned only, but not analyzed, in the last volume of the 'Zoological Record,' obligingly communicated to me with other memoranda by Professor Deshayes, whilst slowly recovering from a severe illness contracted during the German siege:—"In Mollusca we have also to regret that we have no complete work embracing the whole of this important branch of the animal kingdom. It is true that we make use of numerous works published in England, amongst which several are excellent, such as those of Forbes and Hanley, Gwyn Jeffreys, &c. Nevertheless I have to point out to you an excellent work published in 1869 by M. Petit de la Saussaye. The author, a very able and scientific conchologist, is unfortunately just dead. He has had the advantage of preparing a general catalogue of testaceous Mollusca of the European Seas, possessing in his own collection nearly the whole of the species inserted, and of having received direct from the authors named specimens of the species foreign to the French coasts. This work is divided into two parts. The first is devoted to the methodical and synonymical catalogue of the species, amounting to 1150. In the second part, these species are distributed geographically into seven zones, starting from the most northern and ending with the hot regions of the Mediterranean. These zones are thus distinguished:—1, the polar zone; 2, the boreal zone; 3, the British zone; 4, the Celtic zone; 5, the Lusitanian zone; 6, the Mediterranean zone; and 7, the Algerian zone. Some years since it would have been impossible for M. Petit to have established the fifth zone, for that nothing, literally nothing, was known of the malacological fauna of Spain. Its seas were until 1867 less known than those of New Holland or California. It was only in that year that Hidalgo published a well-drawn-up synonymic catalogue in Crosse and Fischer's 'Journal de Conchyliologie.'"

VIII. Britain.

The British Isles have less even than France of an endemic character in respect of biology. They form, as it were, an outlying

portion of regions already mentioned, the greater part, as in the case of France, belonging to the extreme end of the great Russo-European tract. Like France, also, they partake, although in a reduced degree, of that Western type which extends upwards from the Iberian peninsula. They are, however, completely severed from the Mediterranean as from the Alpine regions; their mountain-vegetation, and, as far as I can learn, their mountain-zoology, is Scandinavian; and if it shows any connexion with southern ranges, it is rather with the Pyrenees than with the Alps. The chief distinctive character of Britain is derived from her insular position, which acts as a check upon the passive immigration of races, and is one cause of the comparative poverty of her fauna and flora; the isolation, on the other hand, may not be ancient enough or complete enough for the production and preservation of endemic forms. As far as we know, there is not in phænogamic botany, nor in any of the orders of animals in which the question has been sufficiently considered, a single endemic British race of a grade high enough to be qualified as a species in the Linnæan sense. How far that may be the case with the lower cryptogams cannot at present be determined; there is still much difficulty in establishing species upon natural affinities, and (in some Lichens and Fungi for instance) much confusion between phases of individual life and real genera and species remains to be cleared up. The study of our neighbours' faunas and floras is therefore necessary to make us fully acquainted with the animals and plants we have, and useful in showing us what we have not, but should have had were it not for causes which require investigation—such, for instance, as plants like *Salvia pratensis*, a common European species to be met with in abundance the moment we cross the Channel, but either absent from or confined to single localities in England.

There is no country, however, in which the native flora and fauna have been so long and so steadily the subject of close investigation as our own, nor where they continue to be worked out in detail by so numerous a staff of observers. To the Floras we possess a valuable addition has been made within the last twelvemonth in J. D. Hooker's 'Students' Flora of the British Isles'—the best we have for the purposes of the teacher, and in which the careful notation of the general distribution of each species is a great improvement on our older standard class-books. H. C. Watson's recently completed 'Compendium of the Cybele Britannica' treats of the geographical relations of our plants with that accuracy of detail which characterizes all his works. In zoology, although we

may not have compact synoptical Faunas corresponding with our Floras in all branches of the animal kingdom, the series of works on British Vertebrata published by Van Voorst are a better and more complete account of our indigenous races than any Continental state can boast of; and I observe with much pleasure that, in the new edition announced of the 'British Birds,' Mr. Newton proposes specially to follow out the determination of their geographical range, upon which Mr. Yarrell had bestowed so much pains. With regard to our Mollusca, we have been very fortunate. Forbes and Hanley's costly work, published by the Ray Society, has been followed by Gwyn Jeffreys's 'British Conchology,' the great merits of which as a Malacological Fauna of Britain have been fully acknowledged abroad as well as at home. The present geographical as well as the fossil range of the species is specially attended to; and the only thing missed is, perhaps, a general synoptical view of the characters of the classes, families, and genera into which the species are distributed. The Ray Society series comprises also several most valuable works on the lower orders of British animals; but the entomological fauna of our country, especially in relation to the insects of the adjoining continent, notwithstanding the numerous able naturalists who devote themselves to its study, appears to be somewhat in arrear. In answer to my query as to works where our insects are compared with those of other countries, I received from our Secretary, Mr. Stainton, the following reply:—"The questions you have put to me with reference to our entomological literature are very important; they, however, painfully call my attention to the necessarily unsatisfactory nature of my replies. Wollaston's 'Coleoptera Hesperidum'* is the only separate work to which I can direct your attention as giving the fauna of a particular district with the geographical range of such of the species as are likewise found elsewhere. R. M'Lachlan, who in 1865 had published (Trans. Ent. Soc. ser. 3, v.) a Monograph of the British Caddis-flies, gave in 1868 (Trans. Ent. Soc. for 1868) a Monograph of the British Neuroptera Planipenna; but little is there said of the European range of our species. In 1867 (Entom. Monthly Mag. iii.) Mr. M'Lachlan, who is one of our most philosophical writers, gave a Monograph of the British Psocidæ; and he there says, with reference even to their distribution in our own country, 'As a rule, I have not mentioned special localities; these insects have been so little collected that an enumeration here of known or recorded localities would probably appear ridiculous in a few years.' The

* Referred to in my Address of 1869.

Rev. T. A. Marshall has given (Entom. Monthly Mag. i. to iii.) an Essay towards a knowledge of the British Homoptera, in which occasionally allusion is made to the European distribution of our British species.

"The position of the Insect-fauna of Britain may be thus stated:— The late J. F. Stephens commenced in 1827 a systematic descriptive work of all the orders of British Insects as 'Illustrations of British Entomology;' it ceased to appear after 1835, until a supplementary volume came out in 1846. The Lepidoptera, Coleoptera, Orthoptera, Neuroptera were wholly, the Hymenoptera partly, done, the Hemiptera and Diptera altogether left out. In 1839 Mr. Stephens published, in a more compendious form, a 'Manual of British Beetles.' In 1849 an attempt was made to supply the gaps in the British Entomology left by Stephens, and a scheme of a series of volumes called 'Insecta Britannica' was elaborated, in which Mr. F. Walker was to undertake the Diptera, Mr. W. S. Dallas the Hemiptera, and, great progress having been made in our knowledge of the smaller moths since 1835, I undertook to write a volume on the Tineina. This scheme was so far carried out, that three volumes on the British Diptera by Mr. F. Walker (assisted by the late A. H. Haliday) appeared in 1851, 1852, and 1856, and my volume on the British Tineina in 1854. In 1859 another great group of the smaller moths was described by S. J. Wilkinson, in a volume entitled 'The British Tortrices.' The British Hemiptera not having been done by Mr. Dallas, were undertaken by Messrs. Douglas and Scott for the Ray Society: and in 1865 a 4to volume was issued, containing the Hemiptera Heteroptera, leaving the Homoptera for a second volume, still in progress. Even in this elaborate work little or nothing is said of the geographical distribution out of Britain of our British species. The same remark will apply to the late J. F. Dawson's 'Geodephaga Britannica,' published in 1854, to Westwood's 'Butterflies of Great Britain,' published in 1855, and to E. Newman's 'Illustrated Natural History of British Moths,' published in 1869.

"I believe I do not at all exaggerate if I say that for many years Entomology was pursued in this country with an insularity and a narrow-mindedness of which a botanist can scarcely form a conception. The system of only collecting British Insects was pursued to such an extent that it was almost a crime to have a non-British insect in one's possession: if accidentally placed in one's cabinet it might depreciate the value of the entire collection; for Mr. Samuel Stevens can assure you that the value of the specimens depends very

much upon their being indubitably and unmistakably British. A specimen caught in Kent which would fetch £2 would not be worth 2 shillings if caught in Normandy. I satirized this practice several years since in the 'Entomologist's Weekly Intelligencer' (vol. v. and 1858, articles 'Jeddo' and 'Insularity'); but it is yet far from extinct."

Perfectly concurring in Mr. Stainton's observations in the last paragraph, I would however add that there are purposes for which a local or geographical collection distinct from the general one may be of great use; and such a collection would be much impaired by the introduction of stray foreign specimens. In a local museum, a separate room devoted exclusively to the productions of the locality is very instructive with reference to the history of that locality; and I have seen several such spoiled by the admission of exotic specimens, giving the visitor false impressions which it takes time to remove. But it is never from such an exclusive collection that the fauna or flora of the district can be satisfactorily worked out, or that any branch of zoology or botany can be successfully taught.

Mr. Stainton adds, "It has been suggested to me that those who have critically studied the distinctions between closely allied species have rarely the time to work out in addition their geographical range, and that those who might work up the latter subject might fail in their good intentions for want of a proper knowledge of species." Upon this I would observe that, in the due appreciation of a species (of its limits and connexions), its geographical range and the various forms it assumes in different parts of its area are an essential element; and it appears to me that the neglect of this and other general characters is one reason why many able naturalists, who have devoted their lives to the critical distinction of races of the lowest grades unduly raised to the rank of species, have really contributed so little to any science but that of sorting and naming collections. On the other hand, the study of geographical range without a proper knowledge of species is little more than pure speculation. Division of labour carried too far tends to narrow the mind, and rather to delay than to advance the healthy progress of science.

Mr. Stainton informs me that "there has just appeared a Monograph of the Ephemeridæ, by the Rev. A. E. Eaton (Trans. Entom. Soc. 1871), treating of these insects throughout the globe; and when any species are noticed which occur in this country, their entire geographical range is noticed. It is altogether a valuable paper, on account of the thoroughness with which it seems to be done."

Since I last noticed our biological publications two valuable and beautifully illustrated but costly Ornithological works, Sclater and Salvin's 'Exotic Ornithology' and Sharpe's 'Monograph of the Alcedinidæ,' have been completed, and various Memoirs by Flower, Mivart, Parker, and others have considerably advanced our knowledge of the comparative anatomy of various groups of Mammalia. In our own country also, as well as on the Continent, the biology of various distant lands has continued to be worked out in memoirs or independent publications, which I had contemplated noticing in succession; but time obliges me now to stop, and defer to a future occasion the compilation of the notes I had collected on North American, Australian, and other Monographs, Faunas, and Floras.

The Secretary reported that the following Members had died, or their deaths been ascertained, since the last Anniversary:—

FELLOWS.

Thomas Anderson, M.D.
R. Parr Bamber, Esq.
Nathaniel Buckley, M.D.
Robert Chambers, Esq.
Archdeacon William Hale, M.A.
A. H. Haliday, Esq.
Rev. Charles Hotham.
Richard Peek, LL.D.
Charles A. Robinson, Esq.
J. G. Veitch, Esq.
James Yates, Esq.

FOREIGN MEMBERS.

Moritz Herold.
F. A. W. Miquel, M.D.

ASSOCIATE.

Henry Denny.

The Secretary also announced that nineteen Fellows and one Foreign Member had been elected since the last Anniversary.

At the Election which subsequently took place, George Bentham, Esq., was re-elected President; William Wilson Saunders, Esq., Treasurer; and Frederick Currey, Esq., and H. T. Stainton, Esq., Secretaries. The following five Fellows were elected into the Council, in the room of others going out:—viz. A. W. Bennett, Esq., F. D. C. Godman, Esq., M. A. Lawson, Esq., S. J. A. Salter, Esq., the Rev. Thomas Wiltshire.

Mr. Daniel Hanbury, on the part of the Auditors of the Treasurer's Accounts, read the Balance-sheet, by which it appeared that the total

Receipts and Payments of the Linnean Society from May 1, 1870, *to April* 30, 1871.

	£	s.	d.	£	s.	d.
Balance in the hands of the Bankers at the last audit ...				250	9	7
Admission Fees	102	0	0			
Compositions	240	0	0			
Annual Contributions of £2 2*s*.	23	2	0			
Do. do. of £3 0*s*.	575	17	0			
Transactions, Journal, &c. sold	194	12	5			
Interest on Consols and other Investments	66	17	2			
Expenses of warming, lighting, tea, &c., repaid by other Societies	10	12	4			
Balance of Bentham Portrait Fund	0	12	0			
				1213	12	11
Investment (E. Indian Railway Debenture) repaid				100	0	0
				£1564	2	6

	£	s.	d.
Insurance, Taxes, &c.	7	7	1
Repairs and Furniture	5	4	3
Coals, Gas, Tea, Postage, &c.	89	9	9
Salaries	215	0	0
Expenses of the Society's Publications	728	0	8
Books purchased	41	10	1
Bookbinding and Stationery	26	8	8
Commission	15	9	6
	£1128	5	0
Balance in the hands of the Bankers	435	17	6
	£1564	2	6

W. WILSON SAUNDERS, *Treasurer*.

The foregoing Accounts have been examined, and the Balance in hand found to be correctly stated at £435 17*s*. 6*d*.

GEORGE BENTHAM, *President*.
DANIEL HANBURY,
THOMAS WILTSHIRE,

H. T. STAINTON,
R. C. A. PRIOR,
HENRY LEE.

May 19th, 1871.

Receipts during the past year, including a Balance of £250 9s. 7d., carried from the preceding year, and an Investment of £100 (Railway Debenture) repaid, amounted to £1564 2s. 6d., and that the total Expenditure during the same period amounted to £1128 5s., leaving a Balance in the hands of the Bankers of £435 17s. 6d.

Mr. W. W. Saunders, on behalf of the following Subscribers, presented to the Society the cast of a bust, by Mr. Weekes, of J. J. Bennett, Esq., V.P.L.S.

T. Bell, Esq.
Dr. Bowerbank.
F. Currey, Esq.
Richard Kippist.
John Miers, Esq.
Algernon Peckover, Esq.
Dr. Prior.
W. W. Saunders, Esq.
H. T. Stainton, Esq.
Alfred White, Esq.
James Yates, Esq.

OBITUARY NOTICES.

The Secretaries then laid before the Society the following Notices of Deceased Members.

Dr. Thomas Anderson was Superintendent of the Royal Botanic Gardens at Calcutta. He was a devoted student of natural history at Edinburgh, and selected the East-India Company's service as likely to afford him opportunities for the prosecution of those studies, as it had done to many others. On the occasion of Dr. Thomson leaving Calcutta, Dr. Anderson was appointed to the temporary charge of the Gardens; and he afterwards succeeded to the office of Superintendent upon the retirement of Dr. Thomson.

Before his appointment as Superintendent, Dr. Anderson had taken great interest in the introduction of Cinchona into Bengal. He visited Java and brought the first plants to Sikkim himself. As long ago as 1855 he wrote on the subject in the 'Indian Annals of Medical Science,' and recommended in particular the cultivation of the plant at Darjeeling, where, under his auspices, it has since succeeded so well. After his appointment, (in addition to the proper duties of his post) he took charge of the Cinchona plantations, and spared no exertion to make them successful. The early years of Cinchona-cultivation in India were full of disappointment. The plantations were moved repeatedly before a suitable spot could be found; and the subordinate gardeners at first gave much trouble. Dr. Anderson laboured indefatigably during this anxious time; and his Reports describe the successful steps which were gained one by one, notwithstanding repeated disheartening failures, which would have

discouraged a less energetic man. Dr. Anderson was frequently on horseback ten or twelve hours in the day, and often in continuous rain. He had to visit the close tropical valleys, and then to mount to Darjeeling, which he often reached chilled through and completely exhausted. It is thought that these journeys to the low-level plantations were the origin of the fever which fastened upon him, and which at last caused his death. His labours, however, were completely successful, so far as the object of the Government was concerned. When he left India in February 1869 he had overcome every difficulty in the cultivation of *Cinchona succirubra* and *C. Calisaya*, and had left to his successors the easy task of extending the plantations by mere imitation. In February 1869 he was compelled to return to England on account of dangerous illness, though his friends feared lest his strength should prove insufficient to bear the journey. He reached his native land in a very weak state, but soon recovered sufficiently to enable him to prosecute his botanical work. He began in earnest at the 'Flora of India;' and there was good reason to hope that this greatly desiderated Flora would ere long be published. In the summer of 1870, however, he suffered a relapse, which compelled him to discontinue his labours; and although he sought by quiet and rest to recover his health, he never rallied, and on the 26th of October last died at Edinburgh.

Abstracts of Dr. Anderson's valuable Reports on the Cinchona Plantations have been printed at different times in Seemann's Journal of Botany, where is also to be found an interesting account of the terrible cyclone which in 1865 brought desolation to the gardens under Dr. Anderson's care. Besides these official communications, Dr. Anderson published the following papers on systematic botany:—

"Florula Adenensis." Supplement to vol. v. Linn. Soc. Journ. (1860).

"On *Sphærocoma*, a New Genus of *Caryophylleæ*." Linn. Soc. Journ. vol. v. p. 15 (1861).

"An Enumeration of the Species of *Acanthaceæ* from the continent of Africa." Linn. Soc. Journ. vol. vii. p. 13 (1864).

"On a presumed case of Parthenogenesis in a Species of *Aberia*," *l. c.* p. 67.

"On the Identification of the *Acanthaceæ* of the Linnean Herbarium," *l. c.* p. 111.

"An Enumeration of the Species of Ceylon *Acanthaceæ*," in Thwaites's 'Enum. Plant. Zeyl.' p. 223 (1864).

"*Aphelandra ornata* from Brazil." Seemann's 'Journ. Bot.' vol. ii. p. 289 (1864).

"On Two Species of *Guttiferæ*." Linn. Soc. Journ. vol. ix. p. 261 (1867).

"An Enumeration of the Indian Species of *Acanthaceæ*," *l. c.* p. 425.

Dr. Anderson was elected a Fellow of this Society on the 20th of January 1859.

Nathaniel Buckley, M.D., was in practice in the medical profession at Rochdale, in Lancashire. He was a Doctor of Medicine of St. Andrew's and Member of the Royal College of Surgeons of England. He was also a Fellow of the Botanical Society of Edinburgh. He died on the 13th of January 1871, aged 49, having been elected a Fellow of this Society on the 18th of April 1843.

Robert Chambers, LL.D., was born at Peebles, on the banks of the Tweed, in the year 1802. His father, Mr. James Chambers, was a muslin-weaver, and at first a prosperous manufacturer, but he was eventually ruined by the competition of machine with hand-loom weaving. Robert Chambers received his early education at the Grammar School at Peebles. Being unable, from a painful defect in his feet, to join in the play of his schoolfellows, he became a quiet, studious boy. When he was twelve years old his father removed to Edinburgh; and for two years afterwards the son went to a school kept by Mr. Benjamin Mackay, who was afterwards Head Master of the High School. Meanwhile the family had been reduced to poverty, and Robert Chambers was obliged to start in the world at the early age of fifteen. He gives some account of this part of his life in the preface to his collected works in 1847; and in a letter addressed to the late Hugh Miller, in 1854, he gives some more details of his early struggles. He says, "Till I proved that I could help myself no friend came to me. The consequent defying, self-relying spirit in which at sixteen I set out as a bookseller, with only my own small collection of books as a stock—not worth more than two pounds, I believe—led to my being quickly independent of all aid: but it has not been all a gain; for I am now sensible that my spirit of self-reliance too often manifested itself in an unsocial, unamiable light, while my recollections of 'honest poverty' may have made me too eager to attain worldly prosperity." His elder brother William having started as a printer and bookseller, the two commenced a weekly Miscellany, called 'The Kaleidoscope;' but it was discontinued at the end of 1821. Robert Chambers's next literary venture was more successful. The Waverley Novels being then in the height of their fame, he wrote a volume entitled 'Illustrations of the Author of Waverley,' consisting of descriptive sketches of the

supposed originals of the novelist. The success of this book encouraged him, when only twenty years of age, to compose his 'Traditions of Edinburgh,' many of the anecdotes in which he derived from Sir Walter Scott, with whom in his later years Robert Chambers was on terms of close friendship. This work made his reputation, and other books followed in rapid succession from his pen. Among these may be mentioned 'Walks in Edinburgh,' 'Popular Rhymes of Scotland,' the 'Picture of Scotland' (which was composed after extensive excursions on foot), the 'Histories of the Scottish Rebellions,' 'Life of James I.,' 'Scottish Ballads and Songs,' and a 'Biographical Dictionary of Distinguished Scotsmen.' Besides writing these works and attending to his regular business, Robert Chambers acted for some time as editor of the 'Edinburgh Advertiser;' and in conjunction with his brother, he brought out the 'Gazetteer of Scotland,' a work involving immense labour. The latter end of the year 1831 was a critical period in the fortunes of the brothers Chambers. The agitation for Parliamentary Reform was accompanied by a move for the spread of education. The Society for the Diffusion of Useful Knowledge was started, with a formidable organization of chairmen, treasurers, committees, paid and honorary secretaries, and local agents. Amongst other publications launched by this Society was 'The Penny Magazine.' A copy of the prospectus (which appeared a long time before the periodical itself) was seen by William Chambers, who had long been contemplating a similar periodical; and he forwarded to one of the chief promoters of 'The Penny Magazine' several suggestions which, in his judgment, would have improved the chances of the project. No answer was returned to his letter; and he determined to carry out his own idea, which took the form of 'Chambers's Edinburgh Journal.' The first number appeared on the 4th of February 1832, six weeks before the Society in London fulfilled its promise of a 'Penny Magazine.' Success exceeded not only expectation, but the means of production. The projector had to call in the aid of his brother Robert for the editorship; and all Edinburgh proved to be equal only to produce the Scotch edition, one of the largest printing offices in London being employed to work off the supply for England and the colonies. 'The Penny Magazine' expired long ago. 'Chambers's Journal' still flourishes among the widely read weekly periodicals of to-day. In spite of his engrossing literary occupations at home, Mr. Robert Chambers managed to see a good deal of the world. Being interested in geological subjects, and especially desirous to examine the action of glaciers, he visited Switzerland,

Sweden and Norway, Iceland and the Faroe Islands, besides travelling through India and the United States; and he published excellent popular accounts of his travelling experiences. The later period of Mr. Robert Chambers's literary career includes the following among other works:—A 'History of the British Empire,' 'History of Scotland,' 'Cyclopædia of English Literature,' 'Domestic Annals of Scotland,' 'Ancient Sea Margins,' a carefully edited edition of Burns's Works, and the 'Book of Days'—a work of the nature of 'Hone's Every Day Book.' This book, which appeared in 1864, involved several years of research in the British Museum; and this labour, associated as it was with some domestic calamities, acted injuriously upon the author's nervous system, and put an end to his literary labours, after he had worked incessantly for upwards of forty years, and had produced nearly a hundred volumes abounding in original thought. On his return to Scotland he took up his residence at St. Andrews, where the Senatus Academicus of the University conferred on him the degree of Doctor of Laws. A memorial of Robert Chambers would hardly be complete without mention of the book called 'Vestiges of the Natural History of Creation,' published more than a quarter of a century ago, and which, by its advocacy of the view that the affairs of the world are subject to what has since been called the "reign of law," gave great offence in certain religious circles. Its real author may perhaps never be known, unless some evidence confirming that which already exists be left among Mr. Chambers's papers. The book has been ascribed to Mrs. Robert Chambers. The controversy which it engendered was most envenomed in the North; and when, in 1848, Robert Chambers was elected to be Lord Provost of Edinburgh, he thought it better to withdraw in the face of the storm that was raised against him as the supposed author. Mr. Chambers was twice married, first to Miss Anne Kirkwood, of Edinburgh, who died in 1863, having borne him eleven children, nine of whom still survive. He afterwards married a widow lady named Frith, who died about a year ago. In social life Mr. Chambers was a universal favourite—hospitable, full of kindliness, and shrewd and amusing in conversation. He died at St. Andrews, on the 17th of March 1871. He was elected a Fellow of this Society on the 4th of November 1858.

Henry Denny was a native of Norwich, where he was born in the year 1803. He resided at Norwich until 1825, when he went to Leeds upon being appointed sub-curator of the Leeds Philosophical Society, a title which was afterwards changed to that of Curator and Assistant Secretary.

Palmer, Treasurer of Christ's Hospital; and it was within the walls of that institution that his early years were passed. At eight years of age he entered the Charterhouse School, at that time under Dr. Raine, and at the end of his school career passed to Oriel College, Oxford, where he took his bachelor's degree in Michaelmas Term 1817, obtaining a second class in both classical and mathematical honours. He was ordained deacon in 1818, and priest in the following year, by the then Bishop of London, Dr. Howley. In 1824 he became chaplain to Bishop Blomfield, then bishop of Chester (under whom he had served as afternoon and evening lecturer at Bishopsgate), and he continued to hold the same position on the promotion of Dr. Blomfield to the see of London. In 1823 he was appointed, mainly through the influence of Archbishop Howley and Bishop Blomfield, to the preachership of the Charterhouse. The duties of this post he continued to discharge until twenty-eight years ago, when on the death of Dr. Philip Fisher he was promoted to the mastership of that foundation. He was advanced by Bishop Blomfield successively to the archdeaconries of St. Alban's and of Middlesex, but was transferred in 1840 to the archdeaconry of London, to which was attached the post of a Canon Residentiary of St. Paul's Cathedral. He also held the living of St. Giles's Cripplegate from 1847 to 1857, when he resigned it. The archdeacon was an active member of the Committee of the Society for Promoting Christian Knowledge, the Society for the Propagation of the Gospel in Foreign Parts, and of other societies of the English Church. A great friendship existed between the archdeacon and Bishop Blomfield, founded on similarity of tastes and habits of judgment. Both belonged to the school of divines and theologians rather than of popular and attractive preachers. Archdeacon Hale, though so long resident in London, did not take a prominent part in City movements. His name seldom appeared in connexion with its strifes or its schemes; for he had no taste for the platform. While he held the Cripplegate living, he was exemplary in the discharge of his duties as a parish clergyman, and he was active and vigilant in the oversight of his archdeaconry. His periodical charges to the clergy of London were looked for, and commented upon, almost as eagerly as those of the diocesan himself. They were always distinguished by solid good sense, and for the fearless manner in which he grappled with the current topics of the day. It was for these charges that he reserved his opinion, not only on the religious, but on the social questions of the day; and no one reading those charges could fail to see that, though a silent, he was by no means an indifferent

of North America, published by the Smithsonian Institution, added considerable value to Mr. Walker's work.

Not content with the study of *Diptera*, Mr. Haliday devoted much labour to the classification of the minute parasitic *Hymenoptera* belonging to the *Chalcididæ*, *Proctotrupidæ*, &c. &c. His arrangement of the order *Thysanoptera* in the 3rd and 4th volumes of the 'Entomological Magazine' shows how thoroughly and exhaustively he investigated the most difficult groups of insects. About the year 1860, Mr. Haliday's health became uncertain; severe dyspeptic attacks reacted upon the nervous system, and occasioned periods of apathetic melancholy which he could not shake off, and which rendered all work impossible during their continuance, notwithstanding that his mental powers remained unimpaired. He sought the more joyous climate of Italy, and took up his residence with his relative, Signor Pisani, near Lucca. Here he devoted himself to collecting and studying Italian insects, and to recording the habits of those injurious to the cultivations of that part of the country; but his contributions to Entomological literature were but few in his latter years. In 1868 he visited Sicily, in company with his friend Dr. Perceval Wright; but the fatigues of this journey and the insalubrity of the climate seemed to tell severely upon him. In the same year he took a very active part in the formation of the Italian Entomological Society. He was elected a Fellow of the Linnean Society on the 3rd February 1857, only a short time before the state of his health necessitated comparative quiet from mental exertion. Having been ill at Rome in the summer of 1869, although he recovered for a time, another illness, in 1870, proved fatal. He died on the 12th of July in that year, at the age of sixty-three.

Frédéric Antoine Guillaume Miquel was born on the 24th of October, 1811, at Neuenhaus, in Hanover. He received his early education from his father, Dr. Miquel, and in the year 1829 went as a student to the University of Groningen. Whilst a student he became known as a botanist by his description of the Cryptogams of the Netherlands, which appeared as the second part of C. H. Van Hall's 'Flora of Northern Belgium.' He took his degree as Doctor of Medicine in May 1833, and in November of the same year he was appointed Hospital Physician at Amsterdam, and in 1835 was nominated Lecturer on Botany in the Clinical School at Rotterdam. Whilst in practice as a physician, he published the following works on Botany:—

'Monographia generis Melocacti,' 'Commentatio de vero Pipere Cubeba' (1839), 'Observationes de Piperaceis et Melastomaceis'

mentioned above, Dr. Miquel contributed to a revision of the Pharmacopœia of the Netherlands, which was completed just before his death, but of which he did not live to see the publication. He was a member of most of the scientific societies of Europe, and in May 1850 he was appointed Doctor of Natural Science in the University of Groningen ; he received also the orders of the Lion of the Netherlands, and of the North Star of Sweden, as well as the Austrian Order of Francis Joseph. He was elected a Foreign Member of the Linnean Society on the 2nd of May 1854.

Richard Peek, LL.D., was the second son of William Peek, Esq., of Balham Hill, Surrey. He was born in 1831, and educated for the law. He retired from practice some years ago, and devoted himself to the good of the poor in Brighton, and, in conjunction with the Rev. E. Clay, he did much to improve the condition of the fishermen. He was also an active member of the Board of Guardians, and the author of several pamphlets on the Poor Laws, being a great advocate for equalization of the poor-rates and other social improvements. He devoted much attention to the subject of Ichthyology, and published several papers on that branch of natural history. He died at his country residence, St. Clair, Hayward's Heath, after a very short illness, of congestion of the lungs, on the 14th of April 1871. He was elected a Fellow of this Society on the 21st of April 1864.

Charles Augustus Robinson, F.R.C.S., was for a short time Resident Medical Officer at St. Peter's Hospital, Berners-street. He afterwards left England and went to Kingston, in Jamaica, where he died on the 20th of June 1870. He was elected a Fellow of this Society on the 20th of January 1870, so that his name never appeared in the printed List of Fellows.

John Gould Veitch was born at Exeter, in April 1839. He devoted himself at an early age to the business of a nurseryman, and took an active part in the management of his father's establishment at Chelsea. In 1860, almost as soon as he had attained his majority, he started on a voyage to Japan and China, whence he proceeded to the Philippine Islands. The result of this journey was the introduction to England of many choice plants, among which may be mentioned the lovely *Primula cortusoides amœna*, and several handsome Conifers, such as *Abies firma*, *Abies Alcoquiana*, and *Cryptomeria elegans*, besides *Lilium auratum*, *Ampelopsis tricuspidata* (*Veitchii*), *A. japonica*, and other plants. In 1864 he started for Australia and the South Sea Islands, whence he returned in February 1866, after an absence of eighteen or twenty months, bringing with him some

Master of Caius College, Cambridge, in the formation of the Philological Society in 1842, and had also a considerable share in the management of the British Association for some years after its first establishment in York in 1831. Of late years he devoted especial attention to the subject of the introduction of the metric system into this country. In November 1851 the Institution of Civil Engineers invited essays to be delivered on the best system of remedying the inconvenience resulting from the present want of uniformity between the weights and measures and coins of the different countries of Europe; and the Institute awarded to Mr. Yates their Telford medal for his essay on that subject. He was afterwards engaged in a statistical congress at Paris relating to the same subject, and prepared an account of the origin and formation of the International Association for obtaining a uniform decimal system of measures, weights, and coins; and he continued actively engaged up to the time of his death in promoting the success of that Association.

Mr. Yates always took great interest in the welfare of the Linnean Society, contributing liberally to its funds when appealed to, and frequently, while his health permitted, attending the Meetings of the Society and Council; and our library has been indebted to him for numerous donations, some of very recent date. In his garden at Highgate he was a very successful cultivator of flowering plants, especially the *Cycadeæ*, of which he possessed a beautiful collection of drawings. These drawings have, through the kindness of Mrs. Yates, become the property of the Linnean Society.

Besides numerous able essays on classical, archæological, and other subjects, Mr. Yates was the author of the following papers relating to Natural History:—

1. "Account of a Variety of Argillaceous Limestone found in connexion with the Ironstone of Staffordshire. (Trans. Geol. Soc. vol. v. 1821.)

2. "Notice respecting the Quartz-rock of Bromsgrove Lickie." (Ibid. 2nd series, vol. ii.) Read, June 1822.

3. "Observations on the Structure of the Border Country of Salop and North Wales; and of some detached groups of Transition Rocks in the Midland Counties." (Ibid. 2nd ser. vol. ii.) Read, March 1825.

4. "On the Formation of Alluvial Deposits." (Edinb. New Phil. Journal, 1831.)

5. "Notice of a Submarine Forest in Cardigan Bay." Read, Nov. 1832. (Proc. Geol. Soc. vol. i.)

6. "On Specimens containing Fossil Vegetables from the New

Red Sandstone at Stanford and Ambersley, in Worcestershire." (Brit. Assoc. Report, 1837.)

7. Report of the Committee for making Experiments on the Growth of Plants under Glass. (8vo, London, 1831.)

8. 'On the Footsteps of Extinct Animals observed in a Quarry in Rathbone Street, Liverpool.' (Ibid., 1840.)

9. "Observations on Certain Species of *Cycadeæ*." (Phytologist, vol. iii. 1850.)

10. "Notice of *Zamia gigas*." (Proc. Yorkshire Phil. Soc. 1855.)

11. "On the Inflorescence of *Cycas revoluta* and *Macrozamia spiralis*." (Proc. Linn. Soc. vol. ii.)

Mr. Yates died at Lauderdale House, Highgate, on the 7th of May 1871, at the age of 82. He was elected a Fellow of this Society on the 17th of December 1822.

June 1st, 1871.

George Bentham, Esq., President, in the Chair.

The President nominated J. J. Bennett, Esq., George Busk, Esq., J. D. Hooker, M.D., and W. W. Saunders, Esq., Vice-Presidents for the ensuing year.

Mr. J. C. Melvill, Jun., F.L.S., exhibited specimens of *Siler trilobum*, Scop. (*S. aquilegifolium*, Gærtn.), found on the 25th ult., in a field above the chalk-pit at Cherry Hinton, Cambridgeshire, where it had been previously gathered by Mr. Melvill in June 1867.

The following papers were read:—

1. "Notes on some plants from Northern China," by Henry F. Hance, Ph.D. &c. Communicated by J. D. Hooker, M.D., C.B., V.P.L.S. &c.

2. "On the Hippocrateaceæ of South America," by John Miers, Esq., F.R. & L.SS.

June 15, 1871.

George Bentham, Esq., President, in the Chair.

Mr. Howlett exhibited two living specimens of the Tarantula Spider, which he had received from Madeira; the female had laid a

few eggs, which he believed had been fertilized; and these she carefully guarded in a silken bag.

Professor Westwood exhibited drawings of specimens of insects which in the imago state had still retained the head of the larva:—a *Dytiscus*, from China, in the Bowring collection; a *Gastropodia quercifolia*, in the Stephens collection (both in the British Museum); a *Vanessa Atalanta* and a *Bombyx Mori*, in Mr. Bond's collection; an *Helophilus*, and a *Morpho*, of which Dr. Hagen, now in Cambridge, Massachusetts, had sent him an elaborate drawing.

The following paper was read, viz.:—

"On British Spiders; supplementary to a communication 'On British Spiders new to Science,'" &c., by the Rev. O. P. Cambridge. Communicated by H. T. Stainton, Esq., Sec. L.S.

The following Report, on the Additions to the Library since the last Report (above, p. i), was laid before the Meeting:—

The Publications of Scientific Bodies received since the date of the last Report (Nov. 3rd, 1870) have been the following:—

DENMARK:—

Royal Danish Society of Science, Copenhagen. Transactions (Skrifter), Ser. 5, ix. parts 2 to 4; Proceedings (Oversigt over Forhandlinger), 1870, n. 2.

Botanical Society of Copenhagen, Journal (Tidsskrift), iv. part 1.

SWEDEN:—

Royal Society of Sciences, Upsala. Transactions (Nova Acta). Ser. 3, vii. parts 1, 2.

University of Lund. Transactions (Acta or Års-skrift) for 1869.

RUSSIA:—

Entomological Society of Russia, St. Petersburg. Horæ, vii. n. 1 to 3.

Imperial Society of Naturalists, Moscow. Bulletin, 1870, i. n. 1, 2.

GERMANY :—

Royal Academy of Sciences, Berlin. Index to the Memoirs, 1710 to 1870; Proceedings (Monatsberichte), 1870 June to December, and 1871 February to April.

Royal Horticultural Society, Berlin. Weekly Journal (Wochenschrift), xiii. 1870.

Imperial Academy of Sciences, Vienna. Minutes of meetings (Anzeiger), 1870–1871.

Imperial and Royal Geological Institute (Reichs-Anstalt), Vienna. Transactions (Verhandlungen), v. n. 1; Journal (Jahrbuch), xx. n. 2 to 4.

Zoologico-Botanical Society, Vienna. Transactions (Verhandlungen), xx.

Royal Bavarian Academy of Sciences, Munich. Memoirs (Abhandlungen), x. part 3; Proceedings (Sitzungsberichte), 1870, ii. part 1.

Senckenberg Society of Natural History. Transactions (Abhandlungen), vii. parts 3, 4; Report (Jahresbericht) for 1869–70.

Natural History Society of Hanover. Proceedings (Jahresberichte), 1869–70.

Silesian Society for the education of the Fatherland, Breslau. Natural History and Medicine. Transactions, 1869–70; Proceedings (Jahresberichte), 1869.

DUTCH NETHERLANDS :—

Royal Academy of Sciences, Amsterdam. Transactions (Verslagen en Mededeelingen); Literature, xii.; Natural History, ser. 2, iv.; Annual Report or Journal (Jaarboek), 1869; Minutes of meetings, 1869–70.

Netherlands Entomological Society, the Hague. Journal (Tijdschrift) of Entomology; ser. 2, v. parts 3 to 6, vi. part 1.

BELGIUM :—

Royal Botanical Society of Belgium, Brussels. Bulletin, ix. part 2.

Entomological Society of Belgium, Brussels. Annales, xiii.

SWITZERLAND :—

Society of Physics and Natural History, Geneva. Memoirs, xx. part 2.

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ITALY :—

Royal Academy of Sciences, Turin. Proceedings (Atti), iv. supplement, v.

Royal Instituto of Venice. Memoirs, xiv. part 3; Proceedings (Atti), xiv. parts 6 to 10, xv. part 1.

FRANCE :—

Botanical Society of France. Bulletin, xvii.; Comptes Rendus, n. 2.

ASIA :—

Royal Natural History Society of Dutch India, Batavia. Natural History Journal of Dutch India (Tijdschrift), various parts, completing the Society's series to vol. xxxi.

Asiatic Society of Bengal, Calcutta. Journal, xxxix. (1870), History, etc. parts 3, 4; Physical Science, parts 3, 4; Proceedings, 1870-71.

AUSTRALIA :—

Royal Society of Tasmania. Papers and Proceedings, 1868 and 1869.

BRITISH DOMINION :—

Natural-History Society of Montreal. Canadian Naturalist, new ser. v. parts 2, 3; Canadian Entomologist, ii. to part 11.

Canadian Institute. Canadian Journal of Science, etc., new ser. xiii. part 1.

Nova Scotian Institute of Natural Science, Halifax. Transactions, ii. part 4.

GREAT BRITAIN AND IRELAND :—

Royal Society. Philosophical Transactions, clx. part 2; Proceedings, xix. n. 123 to 127.

Entomological Society. Transactions, 1870, parts 3 to 5.

Geological Society. Quarterly Journal, xxvi. part 4, xxvii. part 1.

Linnean Society. Transactions, xxvii. part 3; Journal, Zoology, xi. n. 50, 51; Botany, xi. n. 56.

London Institution. Journal, n. 1 to 3.

Quekett Microscopical Club. Journal, ii. n. 13.

Royal Agricultural Society. Journal, vii. part 1.

Royal Asiatic Society. Journal, new ser. v. part 1.

Royal Geographical Society. Proceedings, xiv. n. 5, xv. n. 1.

Royal Institution. Proceedings, vi. part 3.

Royal Medical and Chirurgical Society. Proceedings, vi. n. 7; Transactions, liii.

Zoological Society. Transactions, vii. parts 3 to 5; Proceedings, 1870.

Royal Society of Edinburgh. Transactions, xxvi. part 1.

Botanical Society of Edinburgh. Transactions, x. part 2.

Berwickshire Naturalists' Field Club. Proceedings, vii. n. 2.

Malvern Naturalists' Field Club. Transactions, i.

Rugby School Natural History Society. Report for 1870.

Warwickshire Natural History and Archæological Society. 34th Annual Report.

The Biological Papers contained in the above Transactions and Proceedings, and in the Journals received (excepting old volumes or parts analyzed in the Royal Society's Index), and the separate works added to the Library since the last Report, are as follows:—

MAMMALIA AND GENERAL ZOOLOGY:—

E. Atkinson. On some points of Osteology of the Pichinigo (*Chlamydophorus truncatus*), 2 plates. From the Journ. Anat. and Physiol. Presented by the Author.

A. D. Bartlett. On the habits of *Ælurus fulgens* in captivity. Proc. Zool. Soc. 1870.

T. L. W. Bischoff. Contributions to the anatomy of *Hylobates fuscus* and to the comparative anatomy of the muscles of Apes and Man, 5 plates. Trans. R. Bav. Acad. Sc. x.

O. Bollinger. On the *Aneurysma verminosum* of the intestinal arteries and the colic of horses. Proc. R. Bav. Acad. Sc. 1870, i.

W. H. Flower. Additional note on the Common Fin-whale — On the anatomy of *Ælurus fulgens*, woodcuts. Proc. Zool. Soc. 1870.

O. Friedlowsky. On some deformities in an Ape and in a Cat, 1 plate. Trans. Zool.-Bot. Soc. Vienna, xx.

P. Gervais. On the Cetacea of the French shores of the Mediterranean (from the Comptes Rendus). Presented by the Author.

J. B. Gilpin. On the Mammalia of Nova Scotia, 2 papers. Trans. Nov. Scot. Inst. Nat. Sc. ii.

J. E. Gray. On the skulls of *Orca* in the British Museum, woodcuts.—On the arrangement of the genera of Delphinoid Whales.—

Description of an adult skull of *Eupleres Goudotii*, 1 plate.—Notes on *Hapalemur simus*, 1 plate and woodcuts. Proc. Zool. Soc. 1870. —On the genus *Myoictis*.—On a new Lemur from Madagascar.—Various short notes on Mammalia. Ann. Nat. Hist. Ser. 4, vi. vii.

G. Gulliver. On the size of the red corpuscules in the blood of various Mammalia, woodcuts.—On the taxonomic characters afforded by the muscular sheath of the œsophagus in Sauropsida and other Vertebrata. Proc. Zool. Soc. 1870.

C. Koch. On the habits of life of indigenous Bats. Rep. Senckenb. Nat. Hist. Soc. 1869–70.

G. Krefft. Notes on the Fauna of Tasmania, with remarks by M. Allport. Proc. R. Soc. Tasm. 1868–69.—On the skeleton of a rare Whale captured near Lord Howe's Island. Proc. Zool. Soc. 1870.—Notice of a new Australian Ziphioid Whale, woodcut. Ann. Nat. Hist. Ser. 4, vii.

N. Lieberkühn. On the motory phenomena of animal cells (from Trans. Marb. Soc. Nat. Sc.). Ann. Nat. Hist. Ser. 4, vi.

J. C. G. Lucæ. The skulls of the Japanese *Sus pliciceps*, Gray, 3 plates. Trans. Senckenb. Nat. Hist. Soc. vii.

A. Macalister. On some points of the myology of the Chimpanzee. Ann. Nat. Hist. Ser. 4, vii.

A. B. Meyer. On the system of nerves (Hemmungsnerven) of the heart, 8vo. Berlin, 1869. Presented by Mr. Darwin.

St. G. Mivart. On the vertebrate skeleton, 1 plate. Trans. Linn. Soc. xxvii.

J. Murie. On the anatomy of the Prongbuck, *Antilocapra americana*, woodcuts.—On the Saiga Antelope, woodcuts.—On *Phoca grœnlandica*, 1 plate.—On a case of variation in the horns of a Panolian Deer, woodcut. Proc. Zool. Soc. 1870.—Notes on the white-beaked Bottlenose, *Lagenorhynchus albirostris*, Gray, 1 plate. Journ. Linn. Soc. xi.

A. Newton. On *Cricetus nigricans* as a European species, 1 plate. Proc. Zool. Soc. 1870.

J. B. Perrin. On the anatomy of *Balænoptera rostrata*, woodcuts. Proc. Zool. Soc. 1870.

W. C. H. Peters. On *Propithecus Deckenii*, a new species from Madagascar.—Descriptions of new Amphibia, 2 plates.—On new species of *Crocidura* in the Royal Museum, Berlin.—Monographic revision of the Cheiropterous genera *Nycteris* and *Atalapha*. Monatsber. R. Acad. Sc. Berlin. 1870.—Cheiroptera from Sarawak.

Nat. Tijdschr. v. Ned. Ind. xxxi.—On *Pectinator*, a genus of rodent Mammalia from N.E. Africa, 3 plates. Trans. Zool. Soc. vii.

H. Reeks. On the zoology of Newfoundland. Zoologist, ser. 2, vi.

W. Rutherford. On the influence of the vagus on the vascular system. Trans. R. Soc. Edinb. xxvi.

P. L. Sclater. On certain species of Deer in the Zoological Society's Menagerie, 12 plates. Trans. Zool. Soc. vii.—On *Hylobates Lar* and *H. Hoolock*, 1 plate.—A new Kangaroo and a Bat, plate and woodcuts.—A Jackal from the Gaboon, 1 plate.—*Cervus Alfredi*, 1 plate.—*Macacus leoninus*, 1 plate. Proc. Zool. Soc. 1870.

H. Settegast. The rearing of Animals (Die Thierzucht), 1 vol. large 8vo, copiously illustrated. Breslau, 1869. Presented by Mr. Darwin.

R. Swinhoe. A new Deer from China, 2 plates.—On the Mammals of Hainan, 1 plate.—Zoological notes of a journey from Canton to Pekin and Kalgan.—Catalogue of the Mammals of China and Formosa, woodcuts. Proc. Zool. Soc. 1870.

W. Turner. Account of the great Finner Whale, *Balænoptera Sibbaldii*, stranded at Longniddry, 4 plates. Trans. R. Soc. Edinb. xxvi.

ORNITHOLOGY:—

V. Ball. Notes on Birds of the Andaman Islands. Journ. Anat. Soc. Bengal, 1870.

J. V. Barboza du Bocage. A new Pelican, 2 communications. Proc. Zool. Soc. 1870.

R. O. Cunningham. On some points in the anatomy of the Kingfisher, 1 plate. Proc. Zool. Soc. 1870.

C. Darwin. Notes on the habits of the Pampas Woodpecker. Proc. Zool. Soc. 1870.

A. David. Two new Birds from W. Szechuen. Ann. Nat. Hist. Ser. 4, vii.

D. G. Elliot. New genera and species of Birds, 2 plates.—New Pheasants from Eastern Turkestan and Formosa. Proc. Zool. Soc. 1870.

O. Finsch. On a collection of Birds from N.E. Abyssinia and the Bogos country, with notes by W. Jesse, 5 plates. Trans. Zool. Soc. vii.—A new Penguin, 1 plate.—On a collection of Birds from Trinidad. Proc. Zool. Soc. 1870.

E. Giglioli and Count T. Salvadori. New or little-known Birds

collected in the voyage of the corvette Magenta. Atti Acad. Sc. Turin, v.

H. H. Godwin-Austen. Second list of Birds from Khasia, Silhet, etc. Journ. Asiat. Soc. Bengal, 1870.

J. Gould. Two new Humming-birds. Proc. Zool. Soc. 1870.—A new species of *Pitta*. Ann. Nat. Hist. Ser. 4, vii.

J. Haast. On the Dinornis-bones in New Zealand. Proc. Zool. Soc. 1870.

G. Hartlaub. Report on the contributions to Ornithology during the year 1869. Wiegm. Archiv, xxxvi.

G. Hartlaub and O. Finsch. On *Lobiospiza notabilis*, a new Finch from the Navigator's Islands, 1 plate. Proc. Zool. Soc. 1870.

W. H. Hudson. Letters on the Ornithology of Buenos Ayres. Proc. Zool. Soc. 1870.

J. M. Jones. On the Laridæ of Nova Scotia. Trans. Nov. Scot. Inst. Nat. Sc. ii.

H. Magnus. Remarks on the Osteology of the head of Birds, 6 plates. Zeitschr. wiss. Zool. xxi.

C. H. T. and G. F. L. Marshall. On the classification of the Capitonidæ, woodcuts. Proc. Zool. Soc. 1870.

J. Murie. On a specimen of *Aquila Barthelemyi* in the Zoological Society's Gardens. Proc. Zool. Soc. 1870.

R. Owen. On *Dinornis*, part 15, 5 plates. Trans. Zool. Soc. vii.

H. Reeks. Notes on the Birds of Newfoundland. Canad. Naturalist, v.

Count P. Salvadori. Critical review of the descriptive catalogues of Birds collected by O. Antinori in North-central Africa, 2 plates. Atti Acad. Sc. Turin, v.

O. Salvin. On some collections of Birds from Veraguas, with map. Proc. Zool. Soc. 1870.

P. L. Sclater. New and little-known Birds from the Paraná, 1 plate.—Two new Phasianidæ, 2 plates.—On the Cuckoos of the genus *Coccyzus*.—*Ibis Bernieri*, from Madagascar, woodcuts.—Descriptions and figures of Birds from the Museum of the Zoological Society, 4 plates.—New Birds of the genus *Elainea*, woodcuts. Proc. Zool. Soc. 1870.

P. L. Sclater and O. Salvin. New Birds collected by Dr. Habel in the Galapagos Islands, woodcuts.—Synopsis of the Cracidæ.—On some recent additions to the Avifauna of Mexico.—Venezuelan Birds collected by A. Goering, 2 plates.—On Honduras Birds collected by

G. M. Whitely.—Five new Birds from the United States of Columbia, 1 plate. Proc. Zool. Soc. 1870.

R. B. Sharpe. On the genus *Pelargopsis*, Gloger.—On *Campephaga Andersoni*, from S.W. Africa, 1 plate.—On the Birds of Angola, 1 plate.—On the Hirundinidæ of the Ethiopian Region.—Contributions to the Ornithology of Madagascar, 1 plate and woodcuts. Proc. Zool. Soc. 1870.

R. B. Sharpe and H. E. Dresser. New and little-known points in the economy of the Swallow.—On *Lanius excubitor* and its allies. Proc. Zool. Soc. 1870.

J. Stoliczka. Contributions to Malayan Ornithology. Journ. Asiat. Soc. Bengal, xxxix.

R. Swinhoe. On the pied Wagtails from China, woodcuts.—On a new *Accentor* from China, 1 plate.—Seven new Birds from the Yangtsze, 1 plate.—On the Plovers of the genus *Ægialites* in China, 1 plate.—List of Birds collected by Mr. C. Collingwood in China and Japan.—Zoological notes of a journey from Canton to Pekin and Kalgan. Proc. Zool. Soc. 1870.—Four new Asiatic Birds. Ann. Nat. Hist. Ser. 4, vii.

Viscount Walden. Three new species of Asiatic Birds. Ann. Nat. Hist. Ser. 4, vii.

Ibis, Ser. 2. n. 24, and Ser. 3, n. 1 and 2.

ICHTHYOLOGY:—

M. Allport. On the Introduction of Salmonidæ into Tasmania, two communications. Proc. Zool. Soc. 1870.

P. Bleeker. New Fishes from China, 4 papers, 2 plates. Trans. K. Acad. Sc. Amsterdam, Ser. 2, iv.

F. Day. On the Freshwater Fishes of Burmah.—On some Fishes from the W. Coast of India.—On the Fishes of the Andaman Islands. Proc. Zool. Soc. 1870.

P. Gervais. On the Freshwater Fishes of Algeria (from the Comptes Rendus). Ann. Nat. Hist. Ser. 4, vii.

G. Gulliver. On the anatomy and economy of the Lampreys. Proc. Zool. Soc. 1870.

A. Günther. On *Prototroctes*, a genus of freshwater Fishes from Australia. Proc. Zool. Soc. 1870.—*Ceratodus*, and its place in the system. Ann. Nat. Hist. Ser. 4, vii.

C. P. Klunzinger. Synopsis of the Fishes of the Red Sea, part 1. Trans. Zool.-Bot. Soc. Vienna, xx.

C. Lütken. On the limits and classification of the Ganoids (from the Bibl. Genèv.). Ann. Nat. Hist. Ser. 4, vii.

J. Murie. On the irregularity in the growth of Salmon, 1 plate and woodcuts. Proc. Zool. Soc. 1870.

Lieut-Col. Playfair. On *Discognathus lamta* from the neighbourhood of Aden. Proc. Zool. Soc. 1870.

H. Reeks. On the Zoology of Newfoundland. Zoologist, Ser. 2, vi.

F. H. Troschel. On the sexual distinction in *Neosilurus brevidorsalis*. Wiegm. Archiv, xxxvi.

REPTILES AND BATRACHIA :—

W. T. Blanford. On some Reptilia and Batrachia from Central India, 3 plates. Journ. Asiat. Soc. Bengal, xxxix.

B. Dybowskci. On the aquatic Lizards of Siberia. Trans. Zool.-Bot. Soc. Vienna, xx.

E. D. Cope. Note on Siredon-metamorphoses (from Sillim. Journ.). Ann. Nat. Hist. Ser. 4, vii.

A. C. J. Edeling. Researches on the Erpetological Fauna of Sumatra. Tijdschr. v. Ned. Ind. xxxi.

J. E. Gray. Notes on Tortoises of the British Museum, with descriptions of new species, 2 plates.—Notes on three Tortoises living in the Gardens of the Zoological Society, 2 plates.—Two new Tortoises from India in the collection of T. C. Jerdon.—On the family Dermatemydæ, 1 plate.—On *Cyclanosteus senegalensis*, 1 plate.—On *Bartlettia*.—On the species of *Rhinoclemmys* in the British Museum. Proc. Zool. Soc. 1870.—On the claspers of male Lizards. Ann. Nat. Hist. Ser. 4, vii.

A. Günther. On the locality of *Megalixalus infrarufus*.—Revised account of tailless Batrachians in the British Museum, 1 plate.—A new Indian Lizard of the genus *Calotes*. Proc. Zool. Soc. 1870.

A. B. Meyer. On the poison-glands of *Callophis*. Tijdschr. v. Ned. Ind. xxxi. and Proc. Zool. Soc. 1870.

J. Milde. On *Zootoca vivipara*. Trans. Zool.-Bot. Soc. Vienna, xx.

St. G. Mivart. On the axial skeleton of the *Urodela*, woodcuts.—On the myology of *Chamæleon Parsonii*, woodcuts. Proc. Zool. Soc. 1870.

W. v. Nathusius. On the egg-shell of the Adder, and on the oval cords (Eischnüre) of Serpents, Batrachia, &c. 1 plate. Zeitschr. wiss. Zool. xxi.

W. C. H. Peters. On some new Lizards. Monatsber. R. Acad. Sc. Berlin, 1870.

C. Ritsema. On the origin and development of *Periphyllus Testudo*. Trans. R. Acad. Sc. Amsterdam, ser. 2. iv.

A. Sanders. On the myology of *Platydactylus japonicus*. Proc. Zool. Soc. 1870.

F. Stoliczka. On Indian and Malayan Amphibia and Reptilia (continued), 3 plates. Journ. Asiat. Soc. Bengal, xxxix.

R. Swinhoe. List of Reptiles and Batrachia collected in Hainan.—Notes on Reptiles and Batrachia collected in various parts of China. Proc. Zool. Soc. 1870.

W. B. Tegetmeier. On the metamorphoses of the Axolotl, woodcut. Proc. Zool. Soc. 1870.

Crustacea and Arachnida:—

O. P. Cambridge. New British Spiders, 4 plates. Trans. Linn. Soc. xxvii.—Monograph of the genus *Idiops*, 2 papers, 1 plate.—New genera and species of Araneidea, 1 plate.—On Arachnida collected by J. K. Lord in Sinai and on the Red Sea, 1 plate. Proc. Zool. Soc. 1870.

A. Gerstäcker. Report on the scientific contributions to the natural history of Myriopoda, Arachnida, and Crustacea for 1867–8. Wiegm. Archiv, xxxv.

J. A. Herklots. Two new genera of Crustacea living on fish, 1 plate. Trans. R. Acad. Sc. Amsterdam, ser. 2, iv.

A. Metzger. The marine Invertebrata of the coasts of East Friesland. Journ. Nat. Hist. Soc. Hanover, 1869–70.

R. Olsson. New parasitical genera of Copepoda. Mem. Univ. Lund, 1869.

W. Thorell. On European Spiders. Trans. R. Soc. Sc. Upsala, Ser. 3, vii.; also separate copy, presented by the Author.

Entomology:—

F. Brauer. Report on the contributions to Entomology for the years 1867–68. Wiegm. Archiv, xxxiv.; and for 1869, Wiegm. Archiv, xxxvi.

A. G. Butler. List of Diurnal Lepidoptera collected by Mr. Speight in N. India.—On abnormities in the neuration of the hind wings of *Acræa andromacha*. Proc. Zool. Soc. 1870.—On the habitat of *Diadema octocula*. Ann. Nat. Hist. Ser. 4, vii.

Baron de Chaudoir. Monograph of Graphipterides. Bull. Soc. Imp. Nat. Mosc. 1870, i.

H. Davis. On the mobility of the spines of certain Insects' Eggs. Journ. Queck. Microsc. Club, ii.

N. Erschoff. A new Argynnis from E. Siberia. Bull. Soc. Imp. Nat. Mosc. 1870, i.

F. X. Fieber. Twelve new genera and twelve new species of European Hemiptera, 2 plates. Trans. Zool.-Bot. Soc. Vienna, xx.

V. M. Gredler. On *Rhynchota tirolensis*. Trans. Zool.-Bot. Soc. Vienna, xx.

V. Gruber. On the blood of Insects (from Proc. Acad. Sc. Vienna). Ann. Nat. Hist. Ser. 4, vii.

L. v. Heyden. On blind or eyeless Beetles. Rep. Senckenb. Nat. Hist. Soc. 1869–70.

C. Horne. Notes on the habits of some Hymenoptera from the north-west provinces of India; with descriptions of new species by F. Smith, 4 plates. Trans. Zool. Soc. vii.

J. Joseph. On the species of *Anophthalmus* indigenous to the mountain-caverns of Carniolia. Proc. Siles. Soc. 1869.

J. Kriechbaumer. Four new Humble-bees. Trans. Zool.-Bot. Soc. Vienna, xx.

M. Lessona. On the duration of vitality in Flies immersed in Madeira wine. Trans. (Atti) R. Acad. Sc. Turin, v.

B. T. Lowne. On the so-called suckers of *Dytiscus*, and the pulvilli of Insects. Monthly Microsc. Journ. v.

S. J. MacIntire. Notes on the minute structure of the scales of certain Insects, 1 plate. Monthly Microsc. Journ. v.

R. M'Lachlan. New extra-European trichopterous Insects. Journ. Linn. Soc. xi.

R. L. Maddox. On the scales of some Lepidoptera. Monthly Microsc. Journ. v.

J. Mann. Contributions to the Lepidopterous fauna of Raibl, with 1 new species. Trans. Zool.-Bot. Soc. Vienna, xx.

G. Mayr. New Formicidæ. Trans. Zool.-Bot. Soc. Vienna, xx.

L. Milier. Two new species of *Otiorhynchus*. Trans. Zool.-Bot. Soc. Vienna, xx.

V. Motchoulsky. Enumeration of new species of Coleoptera, 2 papers, 3 plates. Bull. Soc. Imp. Nat. Mosc. 1870, i.

J. Murie. On a larval *Œstrus* found in the Hippopotamus. Proc. Zool. Soc. 1870.

A. Murray. Descriptions of Coleoptera from Old Calabar. Ann. Nat. Hist. Ser. 4, vi., vii.

F. H. W. Baron Nolken. *Cidaria tristata* and *C. funerata*. Trans. Zool.-Bot. Soc. Vienna, xx.

V. Oschanin. Descriptions of new metallic-winged Insects (Hemiptera). Bull. Soc. Imp. Nat. Mosc. 1870, i.

A. S. Packard, jun. On Insects inhabiting salt water. Ann. Nat. Hist. Ser. 4, vii.

F. P. Pascoe. Contributions towards a knowledge of Curculionidæ, part 2, 4 plates. Journ. Linn. Soc, xi.—Catalogue of Zygopinæ, a subfamily of Curculionidæ, found by Mr. Wallace in the Indian Archipelago, 2 plates. Ann. Nat. Hist. Ser. 4, vii.

F. Plateau. Physico-chemical investigations upon the aquatic Articulata (from Mem. R. Acad. Brussels). Ann. Nat. Hist. Ser. 4, vii.

A. Preudhomme de Borre. On the classification and geographical distribution of the family of Cicindeletæ. Separate copy, presented by the Author.

C. H. Robertson. Notes on Butterflies, 1 plate. Pop. Sc. Rev. x.

A. Rogenhofer. On *Earias insulana*, B., and a new species. Trans. Zool.-Bot. Soc. Vienna, xx.

M. Rupertsberger. Biological observations: Coleoptera. Trans. Zool.-Bot. Soc. Vienna, xx.

O. Salvin. A new Butterfly of the genus *Paphia*.—New Butterflies from Central America. Ann. Nat. Hist. Ser. 4, vii.

E. Saunders. The species of the genus *Buprestis* referred to their present genera. Presented by the Author.

E. Schwartz. On the Silesian species of *Hydroporus* (some new). Proc. Siles. Soc. 1869.

E. Suffrian. Enumeration of the Curculionidæ collected by Dr. Gundlach in Cuba. Wiegm. Archiv, xxxvi.

C. Tschek. On the Austrian Cryptoidæ. Trans. Zool.-Bot. Soc. Vienna, xx.

F. Walker. Notes on Chalcidiæ. Zoologist, 1871.

J. J. Weir. On the relation between the colour and edibility of Lepidoptera and their larvæ. Separate copy, presented by the Author.

J. Winnertz. Heteropeza and Miastor.—The group of Lestreminæ, 2 plates. Trans. Zool.-Bot. Soc. Vienna, xx.

J. J. Woodward. On the structure of the Podura-scale. Monthly Microsc. Journ. v.

Horæ of the Entomological Society of Russia, vii. n. 1–3.—Ne-

therlands Entomological Society's Tijdschrift v. Entomologie, Ser. 2, v. parts 2–6, vi. part 1.—Annals of the Belgian Entomological Society, xiii.—Canadian Entomologist, ii. parts 7–12.—Transactions of the Entomological Society of London, 1870, parts 3, 4, 5.—Entomologist's Annual for 1871. Presented by Mr. Stainton.—Entomologist, Dec. 1870.—Entomologists' Monthly Magazine, Dec. 1870, to June 1871.

MOLLUSCA :—

H. Adams. A new genus and 18 new species of Mollusca, 1 plate. —A new species of *Fusus*, woodcut.—Additional land and freshwater shells from Eastern Peru, and ten new land and freshwater shells from China and Formosa, 1 plate.—Twenty-six new shells collected by R. McAndrew in the Red Sea, 1 plate.—Two new genera and 5 new species of shells, 1 plate. Proc. Zool. Soc. 1870.

W. Baird. A new genus and species of shells from Whydah, in tropical Africa, woodcut. Proc. Zool. Soc. 1870.

R. Bergh. Anatomical researches on *Triboniophorus Schüttei*, Keferst., and *Philomycus carolinensis*, Bosc., and *P. australis*, Bergh. Trans. Zool.-Bot. Soc. Vienna, xx.

E. Bessels. On the species of *Atax* parasitic on our freshwater Mussels. Ann. Nat. Hist. Ser. 4, vii.

E. de Betta. Malacologia Veneta. Atti R. Inst. Venice, xv.

G. S. Brady. Recent Ostracoda from the Gulf of St. Lawrence, 1 plate. Ann. Nat. Hist. Ser. 4, vi.

J. Brazier. Ten new land-shells from Tasmania.—Notes on two Australian land-shells. Proc. Zool. Soc. 1870.

S. Brusina. Monograph of the genera *Emmericia* and *Fossarulus*. Trans. Zool.-Bot. Soc. Vienna, xx.

E. Charlesworth. The Stone-boring problem. Presented by the Author.

C. Collingwood. On a new form of Cephalopodous Ova, 1 plate. Journ. Linn. Soc. xi.

J. Couch. A new British Mollusk. Proc. Zool. Soc. 1870.

J. C. Cox. Seventeen new land shells from the South-Sea Islands. —Eight new shells from Australia and the Solomon Islands, 1 plate. Proc. Zool. Soc. 1870.

W. H. Dall. On the muscular fibre of Gasteropoda (from Sillim. Journ.) Ann. Nat. Hist. Ser. 4, vii.

E. Giglioli. Notes on the phosphorescence of the sea, including the descriptions of two new species of *Noctiluca*. Atti R. Acad. Sc. Turin, v.

D. F. Heynemann. On the variability of the shells of Mollusca. Rep. Senckenb. Nat. Hist. Soc. 1869–70.

T. Hincks. The *Discophores* or large Medusæ, 1 plate. Pop. Sc. Rev. 1871.

J. Jackno. The land and freshwater shells of Galicia. Trans. Zool.-Bot. Soc. Vienna, xx.

J. G. Jeffreys. Mediterranean Mollusca, n. 2. Ann. Nat. Hist. Ser. 4, vi.

W. Kobelt. The dentition of Malacozoa, and its signification in their systematic distribution. Rep. Senckenb. Nat. Hist. Soc. 1869–70.

R. M'Andrew. Report on testaceous Mollusca obtained in a dredging excursion in the Gulf of Suez. Ann. Nat. Hist. Ser. 4, vi.

F. P. Marrat. A new *Marginella* from S. Africa, part plate. Ann. Nat. Hist. Ser. 4, vii.

A. Metzger. The Invertebrata of the coast of East Friesland. Journ. Nat. Hist. Soc. Hanover, 1869–70.

G. Nevill. On the land-shells of Bourbon. Journ. Asiat. Soc. Bengal, xxxix.

T. C. Noll. On Naiadæ, their development and relation to the remainder of the Animal Kingdom. Rep. Senckenb. Nat. Hist. Soc. 1869–70.

L. Reeve. Conchologia Iconica, parts 284–288. Purchased.

G. B. Sowerby. Forty-eight new shells, 2 plates. Proc. Zool. Soc. 1870.

R. Tate. On the land and freshwater Mollusca of Nicaragua. Separate copy, presented by the Author.

W. Theobald, jun. New land-shells from the Shan States and Pegu. Journ. Asiat. Soc. Bengal, xxxix.

Malakozoologische Blätter, to January 1871.

LOWER ANIMALS:—

— Allman. The genetic succession of zooids in the Hydroida, woodcuts. Trans. R. Soc. Edinb. xxvi.

W. Baird. New Annelida and Gephyrea in the British Museum. Journ. Linn. Soc. xi.

S. Bartsch. On the Rotatoria of the neighbourhood of Tübingen (from the Jahresb. Würtemb. Nat. Hist. Soc.). Ann. Nat. Hist. Ser. 4, vii.

H. J. Carter. Description of three pachytragous Sponges growing on the rocks of the south coast of Devon, 1 plate.—On a freshwater

species of *Ceratium* from Kumaon.—Two new Sponges and two Esperiadæ from the West Indies, 1 plate. Ann. Nat. Hist. Ser. 4, vii.

E. Claparède. Contributions to the anatomy and development of marine Bryozoa, 3 plates. Zeitschr. wiss. Zool. xxi.—The Chætopod Annelida of the Gulf of Naples, 14 plates. Mem. Soc. Phys. Hist. Nat. Geneva, xx.

T. S. Cobbold. A new Entozoon from the Aard-Wolf. Proc. Zool. Soc. 1870.

C. Cubitt. On the winter habits of the Rotatoria, 1 plate. Monthly Microsc. Journ. v.

G. M. Dawson. On Foraminifera from the Gulf and River St. Lawrence. Canad. Naturalist, v.

— Ehlers. On a new form of Sponge (from Proc. Phys. Med. Soc. Erlangen). Ann. Nat. Hist. Ser. 4. vii.

M. H. Gervais. On the Entozoa of Dolphins (from the Comptes Rendus). Ann. Nat. Hist. Ser. 4, vii.

E. Grube. On the Annelida of the Paris Museum. Wiegm. Archiv, xxxvi.

E. D. Harrop. Remarks on the Fluke, *Fasciola hepatica*. Proc. R. Soc. Tasm. 1868–69.

C. T. Hudson. On *Pterodina valvata*, a new species, 1 plate. Monthly Microsc. Journ. v.

H. James-Clark. Note on *Infusoria flagellata* and *Spongiæ ciliatæ* (from Sillim. Journ.). Ann. Nat. Hist. Ser. 4, vii.

M. Johnson. Transmutation of form in certain Protozoa, 1 plate. Monthly Microsc. Journ. v.

W. Kent. Observations on the Madreporaria taken off the coast of Spain and Portugal.—Note on *Dorvillia agariciformis*. Ann. Nat. Hist. Ser. 4, vii.

A. Kölliker. On the structure of Renillæ (from Proc. Med. Phys. Soc. Würzburg). Ann. Nat. Hist. Ser. 4, vii.

E. R. Lankester. On the organization of oligochætous Annelids. Ann. Nat. Hist. Ser. 4, vii.

— Leidy. On *Urnatella*, a genus of ciliated Polyps (from Proc. Acad. Nat. Sc. Philad.). Ann. Nat. Hist. Ser. 4, vii.

R. Leukart. Report on the scientific contributions to the natural history of the lower animals for 1867 to 1869. Wiegm. Archiv, xxxv.

B. T. Lowne. On the anatomy of the round worm (*Ascaris lumbricoides*, Linn.), 2 plates. Monthly Microsc. Journ. v.

A. Metzger. The marine invertebrate animals of the coasts of E. Friesland. Jahresb. Nat. Hist. Soc. Hanover, 1869–70.

J. Murie. A new *Tænia* from the Rhinoceros, woodcut. Proc. Zool. Soc. 1870.

G. D. Nardo. Note on the animal of the *Serpola filograna*. Atti R. Instit. Venice, xv.

P. Olsson. New parasitical genera of Platyelminths, 1 plate. Mem. Univ. Lund, 1869.

W. H. Pease. On the genus *Triphoris*. Proc. Zool. Soc. 1870.

R. A. Philippi. New Sea-stars from Chile. Wiegm. Archiv, xxxvi.

A. Quennerstedt. Contributions to the Infusorial fauna of Sweden, 1 plate. Mem. Univers. Lund, 1869.

W. D. Rotch. On *Cladocoryne floccosa*, a new genus of Hydroid Zoophytes. Ann. Nat. Hist. Ser. 4, vii.

O. Schmidt. The Sponges of the coast of Algiers, 4to, 5 plates. Leipzig, 1868. Presented by Mr. Darwin.

A. Schneider. On the structure of Actiniæ and Corals, and on the development of *Echinorhynchus gigas* (from Proc. Oberhess. Soc. Nat. Med. Sc.). Ann. Nat. Hist. Ser. 4, vii.

S. Trinchese. A new genus of Eolididæ (from Ann. Mus. Hist. Nat. Genoa). Ann. Nat. Hist. Ser. 4, vii.

N. Zenger. On *Peloryctes inquilina*. Bull. Soc. Imp. Nat. Mosc. 1870, i.

PHÆNOGAMIC BOTANY :—

P. Ascherson and R. Magnus. On the species of *Circæa*. Bot. Zeit. 1870.

H. Baillon. History of Plants. Translated by M. M. Hartog. Vol. i. Presented by the publisher.

J. G. Baker. Monograph of the genus *Xiphium*. Seem. Journ. Bot. ix.

A. de Bary. On a remarkable form of Umbelliferæ, *Polylophium hybridum*. Bot. Zeit. 1871.

O. Beccari. Descriptions of two species of *Hydnora* from Abyssinia.—*Petrosavia*, a new genus of Melanthaceæ.—Note on some Bornean Palms.—New or rare Bornean Anonaceæ, 6 plates. Nuov. Giorn. Bot. Ital. iii.

G. Bentham. Cæsalpinieæ Brasilienses, 66 plates. Mart. Fl. Bras. Purchased.

O. Böckeler. The Cyperaceæ of the Royal Herbarium, Berlin.

Linnæa, xxxvi., xxxvii.—Two new species of *Hoppea*, and observations on Indian Cyperaceæ. Flora, 1871.

R. Brown, of Campster. New or little-known American Oaks. Ann. Nat. Hist. Ser. 4, vii.; and a separate copy, presented by the Author.

F. Buchanan-White. On the flowers of *Silene maritima* and *S. inflata*, as regards their stamens and pistils. Trans. Bot. Soc. Edinb. x.

T. Caruel. General review of the Tuscan flora, and its comparison with the floras of Italy and of Europe. Nuov. Giorn. Bot. Ital. iii.

T. Caruel and E. Levier. Floral Calendar for Florence. Nuov. Giorn. Bot. Ital. iii.

A. Devos. On the extension of some southern plants into the basin of the Meuse. Bull. Soc. Bot. Belg. ix.

W. T. T. Dyer and H. Trimen. On *Polygonum nodosum*. Seem. Journ. Bot. ix.

A. C. J. Edeling. Botanical excursion in the neighbourhood of Bidara Tjina. Tijdschr. v. Ned. Ind. xxxi.

A. Engler. Monograph of *Escallonia* and allied genera. Linnæa, xxxvi.—On S. American Escalloniaceæ and Cunoniaceæ. Proc. Siles. Soc. 1869.

N. A. Ernst. On the Guachamacan, a poisonous plant from the plains of Venezuela. Trans. Bot. Soc. Edinb. x.—Notes on various Columbian plants. Seem. Journ. Bot. viii.

T. B. Flower. The Flora of Wiltshire, n. 13. Presented by the Author.

A. Gras. Notes on *Lindernia*, *Scirpus*, *Galeopsis*, *Stellaria*, *Euphorbia*, and *Statice*. Atti R. Acad. Sc. Turin, v.

H. F. Hance. Three new *Eugeniæ*.—On the species of *Canarium* from S. China.—Sixth decade of new Chinese plants. Seem. Journ. Bot. ix.

F. v. Herder. Plantæ Raddianæ Monopetalæ (continued). Bull. Soc. Imp. Nat. Mosc. 1870, i.

W. P. Hiern. On the form and distribution of the Batrachian Ranunculi, 1 plate. Seem. Journ. Bot. ix.

H. Hoffman. On calcareous and saline plants. Presented by the Author.

Hooker's Icones Plantarum. xi. part 4. Presented by Mr. Bentham.

S. Kurz. On *Jaeschkea*, a new genus of Gentianeæ. Journ. Asiat. Soc. Bengal. 1870.

G. Lawson. Monograph of Canadian Ranunculaceæ. Trans. Nov. Scot. Inst. Nat. Sc. ii.

E. Lees. On the plants that more particularly flourish in the Silurian Limestone. Trans. Malvern Nat. Field-Club, i.

C. R. Markham. On *Cephaëlis Ipecacuanha.* Trans. Bot. Soc. Edinb. x.

F. A. W. Miquel. On Japanese Melanthaceæ and Valerianeæ.—On Cycadeæ. Trans. R. Acad. Sc. Amsterdam, Ser. 2, iv.—The species of *Cinchona* cultivated in Java. Tijdschr. v. Ned. Ind. xxxi.

C. Moore. Sketch of the botany of Lord Howe's Island. Trans. Bot. Soc. Edinb. x.

F. Müller. Notes on Australian plants. N. Giorn. Bot. Ital. iii.

A. Neilreich. On the changes in the Vienna flora during the last twenty years. Trans. Zool.-Bot. Soc. Vienna, xx.

J. Pancic. Plantæ Serbicæ rariores, Dec. 3, 6 plates. Mem. R. Instit. Venice, xiv.; and a separate copy, presented by the Author.

— Pérard. Monograph of *Mentha* and its allies. Bull. Soc. Bot. Fr. xvii.

E. Regel. Second supplement to the enumeration of Semenov's Cis- and Trans-Ilian plants. Bull. Soc. Imp. Nat. Mosc. 1870, i.

H. G. Reichenbach. Contributions to Systematic Botany (Australian Orchideæ), 1871. Presented by Mr. Bentham.

P. Rohrbach. On the morphology of Leguminosæ, 1 plate. Bot. Zeit. 1870.—On *Caryophyllineæ.* Linnæa, xxxvi.

E. Rostrup. Flora of the Faroe Islands. Bot. Tidsskr. Copenhagen. iv.

P. A. Saccardo. A new Italian Ophrys. N. Giorn. Bot. Ital. iii.

W. W. Saunders. Refugium Botanicum, iv. parts 1, 2. Presented by the Author.

R. H. C. C. Scheffer. Observationes phytographicæ (descriptions of Archipelago plants), 2 papers.—On the genus *Diplanthera.* Nat. Tijdschr. v. Ned. Ind. xxxi.

N. J. Scheutz. Prodromus Monographiæ Georum. Trans. R. Soc. Sc. Upsala, Ser. 3, vii.

F. Schultz. Observations on some Carices, 1 plate. Flora, 1871.

— Schweinfurth. Botanical notes of his Niam-Niam journey. Bot. Zeit. 1871.

A. Senoner. Enumeration of the plants which appear as weeds in corn-fields in Belgium. Bot. Zeit. 1870.

W. F. Suringar. A new species of *Aryostemma*, 1 plate. Trans. R. Acad. Sc. Amsterdam, Ser. 2, iv.

J. E. Teysmann. On *Lodoicea Sechellarum*. Nat. Tijdschr. v. Ned. Ind. xxxi.

E. R. Trautvetter. New species of *Symphytum*. Bull. Soc. Imp. Nat. Mosc. 1870, i.

H. Trimen. On *Bromus asper*. Seem. Journ. Bot. viii.

A. Unterhuber. The position of the scales of the fruit of *Ceratozamia Mexicana*, Brongn. Trans. Zool.-Bot. Soc. Vienna, xx.

R. de Visiani. Observations on the Linnean Herbarium. Presented by the Author.

R. de Visiani and R. Saccardo. Catalogue of the Vascular Plants of the Venetian territory. Atti R. Instit. Venice, xiv.

— Walpers. Annales Botanices Systematicæ, completion of vol. vii. Purchased.

H. C. Watson. On the Thames-side *Brassica*. Seem. Journ. Bot. viii.

Physiological and Miscellaneous Botany:—

H. Baillon. On the development of the leaves of *Sarracenia* (from the Comptes Rendus). Ann. Nat. Hist. Ser. 4, vii.

Mrs. Barber. On the fertilization and dissemination of *Duvernoia adhatodoides*. Journ. Linn. Soc. xi.

J. Baranetzky. Observations on the effects of light on vegetation. Bot. Zeit. 1871.

A. de Bary. On the waxy coating of the epidermis. Bot. Zeit. 1871.

J. Borodin. On the structure of the apex of the leaf in some aquatic plants, 1 plate. Bot. Zeit. 1870.

D. Clos. Memoranda on various minor points and principles in Systematic Botany. Bull. Soc. Bot. Fr. xvii.

R. O. Cunningham. On the occurrence of pleiotaxy in the perianth of *Philesia*, woodcut. Journ. Linn. Soc. xi.

F. Delpino. Thoughts on Vegetable Biology. Pisa, 1867. Presented by Mr. Darwin.—Ulterior observations on dichogamy in the vegetable kingdom, and Italian translation of Dr. C. Müller's address on insect visitors of flowers. Presented by the Author.

A. W. Eichler. On the position of the leaves in some *Alsodeieæ*, 1 plate. Flora, 1870.

R. Frank. On the motion of chlorophyll grains towards the light. Bot. Zeit. 1871.

H. R. Goeppert. On the degree of cold which vegetation in general will bear. Bot. Zeit. 1871.

A. Grigorieff. On the anatomy of *Phellodendron amurense*, Rupr. Bot. Zeit. 1871.

A. Gris. Comparative Anatomy of the pith of woody plants. Bull. Soc. Bot. Fr. xvii.

Henfrey's Elementary Course of Botany, 2nd edition, by M. T. Masters. Purchased.

H. Hoffmann. Researches on artificial sempervirescence (from the Wochenschrift of the Prussian Hort. Soc.). Presented by the Author.—Experiments on the causes determining the sexes in *Spinacia oleracea* and *Mercurialis annua*. Bot. Zeit. 1871.

F. Krasan. Studies of the periodical phenomena of life in plants connected with the flora of Grätz. Trans. Zool.-Bot. Soc. Vienna, xx.

G. Kraus. On the formation of scorpioid inflorescences. Bot. Zeit. 1870.

P. Magnus. Further observations on the mutual influences of the graft and the stock. Bot. Zeit. 1871.

M. T. Masters and J. H. Gilbert. Reports on experiments on the influence of manures on different species of plants. Presented by the Authors.

T. Meehan. On bud-formation in *Gymnocladus*.—On the flowers of *Aralia* and *Hedera* (from Proc. Acad. Nat. Sc. Philad.). Ann. Nat. Hist. Ser. 4, vii.

W. Mitchell. On equations to the curved outlines of the leaves of plants, 1 plate. Trans. Bot. Soc. Edinb. x.

J. C. P. v. Moens. Researches on the Quina barks in Java. Nat. Tijdschr. v. Ned. Ind. xxxi.

J. T. Moggridge. On petalody of sepals in *Serapias*, 1 plate. Journ. Linn. Soc. xi.

H. v. Mohl. Morphological study of the leaves of *Sciadopitys*. Bot. Zeit. 1871.

Fritz Mueller. On the modification of the stamens of a species of *Begonia*. Journ. Linn. Soc. xi.

N. J. C. Mueller. Researches on some phenomena of growth, 1 plate. Bot. Zeit. 1870.

E. Royer. On the subterraneous parts of plants. Bull. Soc. Bot. Fr. xvii.

S. Rosanoff. On the morphology of the colouring-matter in plants, 1 plate. Bot. Zeit. 1870.

G. Stengel. On the leaves of *Lathræa Squamaria*, 1 plate. Bot. Zeit. 1871.

A. Vogel. On the relation of phosphoric acid and guanin to vegetation. Trans. Bavar. Acad. Sc. x.

E. Warming. On the development of the inflorescence in *Euphorbia*. Flora, 1870.

CRYPTOGAMIC BOTANY :—

F. Ardissone. Review of the *Ceramii* of the Italian flora. N. Giorn. Bot. Ital. iii.

F. Arnold. The Lichens of Carniolia and the Littorale collected by J. Glowacki, 1 plate.—Lichenological excursions in Tyrol. Trans. Zool.-Bot. Soc. Vienna, xx.—Lichenological fragments, 1 plate. Flora, 1871.

F. Baglietto. Synopsis of Tuscan Lichenology. N. Giorn. Bot. Ital. iii.

A. de Bary. *Eurotium*, *Erysiphe*, *Cicinnobolus*, with remarks on the sexual organs of Ascomyceta, 6 plates. Trans. Senckenb. Nat. Hist. Soc. vii.

R. H. Beddome. The Ferns of Southern India, 4to, 271 plates. Presented by Mr. Hanbury.

M. J. Berkeley and C. E. Broome. Notices of British Fungi. Ann. Nat. Hist. Ser. 4, vi., vii.—Fungi of Ceylon, *Agaricus* to *Cantharellus*. Journ. Linn. Soc. xi.

A. Braun. Later researches on the genera *Marsilea* and *Pilularia*, woodcuts. Monatsber. Acad. Sc. Berlin, 1870.

R. Braithwaite. Recent additions to the British Moss-flora, 1 plate. Seem. Journ. Bot. vii.

C. E. Broome. *Scleroderma Geaster*, a new British fungus, 1 plate. Seem. Journ. Bot. ix.—Remarks on fungi of the neighbourhood of Bath. Proc. Bath Nat. Hist. Field-Club, 1871.

J. B. Carnoy. Anatomical and physiological researches on fungi, 9 plates. Bull. Soc. Bot. Belg. ix.

B. Carrington. On Dr. Gray's arrangement of Hepaticæ.—On two new British Hepaticæ. Trans. Bot. Soc. Edinb. x.

M. C. Cooke. Cashmir Morels, woodcuts. Trans. Bot. Soc. Edinb. x.—On polymorphic Fungi, 1 plate. Pop. Sc. Rev. x.

C. Cramer. On the development and pairing of zygospores in *Ulothrix*. Bot. Zeit. 1871.

J. M. Crombie. New British Lichens. Journ. Linn. Soc. xi.

G. Dickie. On the distribution of Algæ. Seem. Journ. Bot. ix.

J. E. Duby. New or little-known exotic Cryptogams, 4 plates. Mem. Soc. Phys. Hist. Nat. Geneva, xx.

A. Geheeb. On *Hypnum hydropteryx*, Schimp. Bot. Zeit. 1871.

E. Hampe. New Mosses from the Melbourne Herbarium, Australia. Linnæa, xxxvi.

E. D. Harrop. On *Phyllactidium pulchellum*. Proc. R. Soc. Tasm. 1868–9.

C. O. Harz. On Ferments. Flora, 1871.

F. Hazslinszky. The *Sphæriæ* of the Rose, 1 plate. Trans. Zool.-Bot. Soc. Vienna, xx.

H. Hoffmann. Mycological Reports, 1870. Presented by the Author.

L. R. v. Hohenbühel-Heuffler. On the supposed station for *Hymenophyllum Tunbridgense* in the region of the Adriatic. Separate copy presented by the Author.

E. v. Glinka Janczewski. Morphology of *Ascobolus purpuraceus*, 1 plate. Bot. Zeit. 1871.

L. Juranyi. On the structure and development of the Sporangia of *Psilotum triquetrum*.—On *Œdogonia*. Bot. Zeit. 1871.

J. Juratzka. New species of Mosses, ½ plate. Trans. Zool. Bot. Soc. Vienna, xx.

J. Juratzka and J. Milde. Contributions to the muscological flora of the Levant. Trans. Zool.-Bot. Soc. Vienna, xx.

H. Karsten. On the hyphogonidian Fungi observed in the human ear, 1 plate. Bull. Soc. Imp. Nat. Mosc. 1870, i.

J. Klein. Mycological communications, 2 plates. Trans. Zool.-Bot. Soc. Vienna, xx.

J. Kny. On the morphology of *Chondriopsis cærulescens*, Crouan, and some peculiar optical phenomena in this Alga, 1 plate. Monatsber. R. Acad. Sc. Berlin, 1870.

A. v. Krempelhuber. Lichens of the voyage of the frigate 'Novara,' 8 plates. Purchased.—Lichens as parasites on Algæ. Flora, 1871.

W. Lauder-Lindsay. The Lichens collected in W. Greenland by R. Brown, 5 plates. Trans. Linn. Soc. xxvii. Supplementary notes to the Lichen-flora of Greenland. Trans. Bot. Soc. Edinb. x.

E. Lees. On the forms and persistency of arboreal Fungi.—On remarkable Fungi and Algæ of the Malvern district. Trans. Malv. Nat. Field-Club, i.

W. A. Leighton. On the chemical reaction in the British species of *Pertusaria*. Ann. Nat. Hist. Ser. 4, vi.

H. Leitgeb. On the position of the leaves in Mosses. Bot. Zeit. 1871.

P. Magnus. Contributions to the knowledge of the genus *Najas*, 4to, 8 plates. Berlin, 1870. Presented by Mr. Darwin.

D. v. Martens. *Kurzia crenacanthoidea*, a new Alga, 1 plate. Flora, 1870.

J. Milde. Ophioglosseæ and Equisetaceæ of the Voyage of the Frigate 'Novara.' Purchased.

W. Mitten. On *Pottia*. Seem. Journ. Bot. ix.

J. Mueller. On *Dufourea madreporiformis*, Achar. Flora, 1870.

W. Osler. On Canadian Diatomaceæ. Canad. Naturalist, v.

G. Passerini. Notes on Italian plants, including some new species of *Puccinia*. N. Giorn. Bot. Ital. iii.

A. Pitra. On *Sphærobolus stellatus*, 1 plate. Bot. Zeit. 1870.

W. W. Reichardt. Fungi, Hepaticæ, and Mosses of the Voyage of the Frigate 'Novara,' 17 plates. Purchased.

J. Ruckmann. On Fairy Rings. Presented by the Author.

W. W. Saunders and W. G. Smith. Mycological Illustrations, part 1. Presented by Mr. Saunders.

— Schroter. On *Synchytriæ*. Proc. Siles. Soc. 1869.

S. Schulzer v. Müggenburg. Mycological observations, with descriptions of new species, 2 papers, 1 plate. Trans. Zool.-Bot. Soc. Vienna, xx.

W. G. Smith. *Agaricus Georginæ*, a new species, 1 plate. Seem. Journ. Bot. ix.

F. Baron v. Thümen. Mycological notes from Greece. Bot. Zeit. 1871.

J. Waly. On the emptying of zoosporangia. Bot. Zeit. 1870.

C. A. Watkins. On Yeast and other Ferments. Journ. Queck. Microsc. Club, ii.

V. B. Wittroch. Observations on Scandinavian Desmidiaceæ, 1 plate. Trans. R. Soc. Sc. Upsala, Ser. 3, vii.

W. Wolff and P. E. R. Zimmermann. Chemical and Physiological experiments on Fungi. Bot. Zeit. 1871.

M. Woronin. *Sphæria Lemaneæ*, *Sordaria fimiseda*, *S. coprophila*, and *Arthrobotrys oligospora*, 6 plates. Trans. Senckenb. Nat. Hist. Soc. vii.

G. Zanardini. New or rare Algæ of the Mediterranean and Adriatic Seas, 8 plates. Mem. R. Instit. Venice, xiv.

J. E. Zetterstedt. The Mosses and Hepaticæ of Œland. Trans. R. Soc. Sc. Upsala, Ser. 3, vii.

PALÆONTOLOGY :—

A. Bell. Contributions to the Crag-fauna. Ann. Nat. Hist. Ser. 4, vii.

— Beyrich. On the basis of the Crinoidea brachiata. Monatsber. R. Acad. Sc. Berlin, 1870, also translated into Ann. Nat. Hist. Ser. 4, vii.

E. Billings. On the structure of Crinoidea, Cystidea, and Blastoidea. Canad. Naturalist, v., and Ann. Nat. Hist. Ser. 4, vii.

H. B. Brady. On *Saccammina Carteri*, a new foraminifer from the carboniferous limestone of Northumberland, 1 plate. Ann. Nat. Hist. Ser. 4, vii.

H. Burmeister. On the pelvis of *Megatherium*. Trans. Zool.-Bot. Soc. Vienna, xx.—On *Saurocetes argentinus*, a new type of Zeuglodontidæ, 1 plate. Ann. Nat. Hist. Ser. 4, vii.

H. J. Carter. On fossil sponge-spicules of the greensand.—On the Coccolith, *Melobesia unicellularis*. Ann. Nat. Hist. Ser. 4, vii.

J. D. Dana. On the supposed legs of the trilobite *Asaphus platycephalus*. Ann. Nat. Hist. Ser. 4, vii.

G. M. Dawson. On Foraminifera from the Gulf and River St. Lawrence.—On spore-cases in coals, woodcuts. Ann. Nat. Hist. Ser. 4, vii.

A. Dickson. The phyllotaxy of *Lepidodendron* and *Knorria*. Seem. Journ. Bot. ix.

C. G. Ehrenberg. On large strata consisting of microscopical Bacillariæ under and near the city of Mexico, 4to, 3 plates. Berlin, 1869. Presented by Mr. Darwin.

G. v. Frauenfeld. Address on the extinct and expiring animals of the most recent geological period. Vienna, 1870. Presented by the Author.

A. Hancock and T. Atthey. On a mandibular ramus of *Anthracosaurus Russelli* and on *Loxomma* and *Archichthys*, 1 plate.—On *Dipterus* and *Ctenodus*, 1 plate. Ann. Nat. Hist. Ser. 4, vii.

J. Hopkinson. On a specimen of *Diplograpsus pristis* with reproductive capsules, woodcuts. Ann. Nat. Hist. Ser. 4, vii.

W. King. On *Agulhasia Davidsonii*, a new Palliobranchiate genus, plate. Ann. Nat. Hist. Ser. 4, vii.

F. Kitton. Diatomaceous deposits from Jutland, 2 plates. Journ. Quek. Microsc. Club, ii.

G. Krefft. A gigantic amphibian allied to *Lepidosiren* from Queensland, woodcuts. Proc. Zool. Soc. 1870.

R. Owen. On the Fossil Mammals of Australia, part 3, 16 plates. Phil. Trans. clx.

E. Parfitt. On an araneaceous Foraminifer from the carboniferous limestone of Devonshire, ½ plate. Ann. Nat. Hist. Ser. 4, vii.

G. A. Pirona. The Hippuritidæ of the Colle di Medea in the Frioul, 10 plates. Mem. R. Instit. Venice, xiv.

H. J. Seeley. Additional evidence of the structure of the head in Ornithosaurs from the Cambridge upper greensand, 2 plates. Ann. Nat. Hist. Ser. 4, vii.

O. Torell. Petrifactions of the Swedish Cambrian formation, 1 plate. Mem. Univers. Lund, 1869.

S. V. Wood. On the assumption of the adult form by the genera *Cypræa* and *Ringicula*. Ann. Nat. Hist. Ser. 4, vii.

H. Woodward. The tertiary shells of the Amazons Valley, 1 plate. Ann. Nat. Hist. Ser. 4, vii.

A. de Zigno. Palæontological Notes. Mem. R. Instit. Venice, xiv.

Palæontographical Society's Publications, xxiv. Purchased.

MISCELLANEOUS :—

C. Balfour. Timber Trees, Timber and Fancy Woods and Forests of India, 3rd edition, 8vo. Presented by the Author.

G. Bennett. Correspondence relating to the cultivation of silk laid before the New South Wales Parliament. Presented by Mr. Bennett.

Emil Blanchard. Six successive annual Addresses on the occasion of the distribution of prizes to the French Provincial Scientific Societies. Presented by Mr. Bentham.

R. Clarke. On Systematic Botany and Zoology, table viii. and conclusion. Presented by the Author.

R. v. Cotta. On the law of development of the Earth, 8vo. Leipzig, 1870. Presented by Mr. Darwin.

R. O. Cunningham. Notes on the Natural History of the Straits of Magellan, 8vo, 1871. Presented by Mr. Bentham.

Forest Administration of India. Reports for the Central Provinces, 1867–68, 1868–69, and 1869–70; for Canara, 1869–70; for the Bombay Presidency, 1869–70; for British Burmah, 1868–69 and 1869–70. Presented by the Government of India.

J. Haast. Anniversary Address to the Philosophical Institute of Canterbury, New Zealand. Presented by the Author.

L. Baron v. Hohenbühel-Heuffler. On Linnæus's views of the Descent theories.—Franz v. Mygind, the friend of Jacquin. Presented by the Author.

L. Jenyns. St. Swithin and other weather saints.—Address of the President of the Bath Natural History and Antiquarian Field-Club, 1871. Presented by the Author.

B. T. Lowne. On so-called spontaneous generation. Journ. Quek. Microsc. Club, ii.

O. Peschel. Few problems in Physical Geography, 8vo. Leipzig, 1870. Presented by Mr. Darwin.

L. Netto. History of the Imperial and National Museum of Natural History of Rio Janeiro.—Contributions to the applied Botany of Brazil.—On the Botany of the Upper San Francisco River. —Short notes on the collection of Brazilian woods in the International Exhibition of 1867. Presented by the Author.

R. Schomburgk. Report as Director of Adelaide Botanic Garden for 1870. Presented by the Author.

J. L. Soubeiran. Curiosities of Alimentation. Presented by the Author.

P. Squire. Companion to the last edition of the British Pharmacopœia. Presented by the Author.

H. Ulrici. God and Nature, 8vo. Leipzig, 1866. Presented by Mr. Darwin.

C. A. Zittel. Obituary notice of Christian Erich Hermann v. Meyer, the palæontologist. Presented by the R. Bavarian Academy of Sciences.

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THE LINNEAN SOCIETY.

On the Geographical Relations of the Chief Coleopterous Faunæ.

By ANDREW MURRAY.

[Read December 17, 1868.]*

JUDGING simply from their structure, habits, and economy, there are reasons why Beetles ought to excel every other class of organized beings as exponents of the past geography of the globe. I say so after having turned over in my mind and contrasted every class of animals and plants with each other with the view of determining for myself which would be most likely, through the study of its geographical distribution, to throw light upon the past history of the earth. I can think of none so likely to do so as insects, and of insects as Beetles.

Over all marine animals they have the insuperable advantage of inhabiting the enclosed instead of the enclosing spaces, of living on dry land and not being able to go beyond it. Over plants, with which their distribution in many respects accords, they have the advantage of being more difficult of dissemination, for neither their eggs nor themselves are endowed with the dormant vitality of seeds, nor with that endurance of exposure to different condi-

* This paper was read on December 17, 1868, but by permission of the Council I have brought it down to the state of our knowledge at the date of publication. —A. M.

tions which may, and occasionally does, enable seeds to be carried in the stomachs of birds or floated across wide oceans to distant lands *. They have also the advantage over the larger and more highly organized animals in that they can survive and find food where the latter could not. Their food is so various that nothing but a total extinction of all other life could wipe them off from the face of a country—a partial submergence of land for even a short period might destroy every mammal upon it, but so long as a tree-top is above the flood or an uncovered rock remains on which they can take refuge, the life of the Beetle class is safe when the waters abate. A succession of cold seasons in which no plant can bloom might destroy those kinds of animals for which, like the bee, flowers and honey are necessaries of life, some beetles might indeed then go; but there are plenty that feed on leaves or stems to preserve the Beetle type in the frozen land. Their numbers, too, multiply the chances of escape in the case of disaster, and their powers of flight enable them to take advantage of such as occur. Further, the powers of flight, although sufficient for a moderate distance, are not like those of birds, so great as to carry them to new lands at great distances and so to risk the disturbance of faunas which such powers, if possessed by such multitudes, might possibly produce. In many respects, too, they are as much *adstricti glebæ* as plants themselves, for a vast host are limited each to one particular plant for food. As in plants, indeed, there are some kinds of Beetles more open than others to the suspicion of having been introduced from one isolated land to another, as, for example, the timber-borers or Longicorns. But there are others, as the hunting or carnivorous species, the apterous species, the blind insects, and others of less specialized structure, whose presence in discontiguous countries seems to bid defiance to any explanation other than that of former continuity of soil. In Madeira, for instance, where the number of admittedly introduced species is very great, there is not one introduction belonging to the hunting families; and if this is the case there, not-

* It is a digression, but it is worth making one, to point out that if plants can be disseminated in the way supposed, and Beetles, or certain families of Beetles, *can not*, the attempt to explain the distribution of the former as due either solely or mainly to these means must be abandoned in every case where their distribution corresponds with that of the latter. The common effect must have been produced by a common cause. And it so happens that this correspondence exists in all the more important and puzzling facts of distribution.

withstanding the accessibility of Madeira to the introducing agencies of man (to which most of the other introductions are referable), it becomes still more difficult to conceive of the dissemination of that kind of beetles by agencies independent of man.

But besides the advantages which the structure, habits, and economy of beetles give for the interpretation of their geographical distribution, there is another important speciality inherent in them which I shall amply illustrate in the course of this paper, and which renders them peculiarly available for the study of its problems, viz. a long-enduring persistency of form by which the same type has been preserved through diverse modifications during many geological epochs. This peculiarity is shared by all other insects, as well as in different degrees by all beings of inferior organization; and the consequence is that in trying to make out the past history of a country through its fauna and flora, we must take each class of beings by itself and study its relations separately, or we shall run the risk of confounding events belonging to different dates. To do otherwise would be like attempting to compile a history of England by combining the political history of one age with the ecclesiastical of another and the scientific of a third. The mammalian fauna took its present form long after the insects had received theirs, and these earlier-dated forms should therefore be able to tell of events long antecedent to what the mammals could speak of. The relations of each must therefore be studied independently, and it is only after all shall have been separately deciphered that the conclusions respectively drawn from each can be brought together and some common general result arrived at. In the mean time, by endeavouring to ascertain the relative date of appearance of insects of various types in different countries, we may be able to assign the order of precedence of a succession of events whose occurrence we can scarcely doubt, but whose order of date we could not otherwise guess at.

My purpose in the present paper is to submit some inferences of this nature from a general view of the geographical distribution of the Coleoptera, indicating a somewhat different arrangement of land and water in ancient times from that which is usually supposed, and to strengthen these inferences by references to what seem to me corresponding facts in other branches of natural history.

The first point to which I shall direct attention is the very in-

teresting problem of the occurrence of similar forms in the temperate and cold regions of both hemispheres. Hitherto the hypotheses by which this has been attempted to be explained have, I believe, either been: 1st, by accidental introduction; 2nd, by the supposition that the glacial epoch had so modified the climate of the globe as to allow an extension or interchange of faunas lying on different sides of the equator; 3rd, by the supposition that one general fauna had formerly extended over the whole world, and that the similarities which we find in antipodal countries are relics of this general fauna; and 4th, that a former geographical connexion with identity of fauna and flora must have subsisted between the two regions. There is another hypothesis to the effect that the similar species are *representative* species, meaning by representative something different from derivative and independent of affinity. This latter proposition, I frankly confess, is beyond my conception. I cannot conceive of any other kind of representation in species than that arising from derivation. The other hypotheses are entitled to more consideration, and I shall briefly state my opinion upon each.

As to similarity being due to the introduction of species by accidental dispersal, it is to be noted that this cause must always be in its very nature exceptional and isolated, and cannot be expected to make its impress on a whole fauna.

The Atlantic islands, for example, which were, and perhaps still are, very generally cited as an instance of colonization by accidental introduction, have been shown by Mr. Wollaston to have all one coleopterous subfauna, and that one peculiar to themselves. The general basis is European, but overlying that is something else, a number of species of special type found in all and found nowhere else. Now if these islands, as is maintained by some, have been peopled by chance visitors from Europe, how have they all got in addition this special type? and why should there be, as in Trophonius Cave, "vestigia nulla retrorsum"? Why have none of these special forms ever wandered to Europe? Why should things only come from Europe and nothing ever go back in return? There is no law against reciprocity here, and yet it is rigorously excluded. Moreover the explanation, if true, should apply to every part of the globe, and illustrations of its existence should be in greatest force in the lands which are nearest to each other and which have most intercourse with each other. And this is notoriously not the case. Australia, although so much

nearer India than Chili, has more affinity with the latter than the former. The Cape-Verde Islands, although so near Cape Verde, have their affinity not with Africa, but with Europe and the other Atlantic Islands. Even in the introductions by man it does not apply. Hear what DeCandolle says of plants. "I am surprised that the commerce of the United States, with Brazil, Chili, New Zealand, the Sandwich Islands, and China, a commerce which has been carried on with great activity for upwards of thirty years, has not yet brought about the naturalization of species from these regions. Up to the present time there is no appearance of it. The *Rubieva multifida*, which has begun to appear at New York, and of which the naturalization is not yet consolidated by the proof of time, is the only plant perhaps which has come in this manner. In future some will arrive, without doubt." [Why so? Surely not from what has happened in the past?] "They may compensate to some extent perhaps the probable diminution of those which will come from Europe"*.

Facts are accumulating upon us to show that diffusion of plants and animals by accidental circumstances beyond physical barriers, such as seas or impassable mountains or deserts, bears no important part in the establishment of any definite fauna or flora. They bear a part, although a small one, in the introduction of occasional new elements into a fauna or flora; but these remain like lumps of stone lying on a soil with which they can neither become incorporated nor harmonize, usually readily distinguishable and referable to the mountains or strata more or less distant from which they have come. Actual continuity of soil and non-interruption by barriers is, I believe, the only cause by which any fauna with a definite character (and no true fauna is without one) has been produced, and subsequent isolation, at least so far as regards physical conditions, that by which it has been preserved. The coral islands of the Pacific are a case in point. They have been supplied both with a fauna and flora entirely from without and by chance dispersal; and they furnish an admirable example of the kind and amount of inhabitants that is to be got by such introductions, even under the most favourable circumstances of tranquil seas, warm climate, and favouring currents; and allowance to such an extent I am always ready to make in examining the elements of any fauna or flora. The details of such a fauna and flora will be given further on when I come to discuss the fauna of

* DeCandolle, Géogr. Botanique raisonnée, p. 755 (1855).

the Pacific islands; in the meantime I may briefly characterize it as meagre to the last degree, most unequal in its proportions, and all traceable to the shores of the nearest lands from which the currents set.

The supposition that the existence of the similarity in question is due to the facilities for migration to or from the northern or southern hemispheres afforded by the low temperature of the glacial epoch is open to various answers. But it is unnecessary to discuss them at all; for I shall presently show that the resemblances to which I have to refer were already in existence before the glacial epoch commenced, consequently could not have been caused by it.

The hypothesis that similar forms occurring at distant places are the remains of a general fauna (or, at least, of a *more* general fauna than now exists), which had in former times extended over the whole or the greater part of the world, is more attractive or more formidable.

I used to think that in that hypothesis I had a satisfactory explanation of all such anomalies as I speak of. Like Shakspeare's barber's chair, it fitted all comers. If the similarity was widely spread, it was due to universal prevalence in former times. If found only in one or two isolated spots, then there were solitary relics of a once universally distributed type! But I confess that my faith in my specific has latterly been a good deal shaken. It costs me nothing to say so, for consistency is a vice to which I have never been addicted. I believe it still to be probably the true explanation of those cases (as in Ferns, for example) where the same type is very widely and generally distributed; but I have abandoned it for most isolated instances, and for all specially localized faunas. In the first place, although I do not dispute that in the earlier stages of the history of our planet there was a greater homogeneity of type than there is at present, it seems pretty well established now, that there have been geographical regions with faunas and floras differing from each other, not indeed to the same degree as now, but to some extent, from the very earliest times of which we have any fossil record; and in the next place, although it is not impossible that a universally distributed form may have died out everywhere but in one or more specified spot or spots, the doctrine of chances prevents us accepting the hypothesis whenever such relics cease to be solitary. Species No. 1 may be a relic left at

spots A and B, and nowhere else; but the moment we find another supposed relic, species No. 2, also left in A and B, and nowhere else, doubt assails us, and increases in an inverse ratio with the occurrence of every additional relic.

The fourth supposition is, I think, the true one, namely, continuity of soil at some former period; and upon that as a basis I rest the propositions I am about to submit. Upon it, I think, I can explain satisfactorily many of the remarkable instances of peculiar geographical distribution which have hitherto defied the ingenuity of naturalists to solve, and notably that which I have first set before me, viz. the resemblance which species from the temperate regions of the northern hemisphere bear to those from similar latitudes in the southern hemisphere. With the help of the above postulate I can trace the links all the way from the one to the other plainly in insects, plants, and land-shells, and more imperfectly in the higher animals; but also in them, if allowance be made for the greater variability in form in the higher animals under change of condition of life, and their distribution be examined in relation to the geographical epochs in which the different forms respectively came into being and most prevailed. The absence of particular mammals in a particular land cannot vitiate my theory, if the distribution of animals in it had been completed before the mammals appeared.

For the better understanding of my argument I shall first state the results at which I have arrived.

The position I am about to maintain then is, that, subject to modifications to be afterwards mentioned, all the Coleoptera in the world are referable to one or other of three great stirpes. These three no doubt originally sprung from one stirps, and acquired their distinguishing features by long-continued isolation from each other, combined with changes in their conditions of life. But now we have three, and only three, great strains, sometimes intermingling with each other, sometimes underlying or overlying each other, and sometimes developed into new forms, but always distinguishable and traceable to one or other of the three sources.

These are—1, the Indo-African stirps; 2, the Brazilian stirps; and 3, what, for want of a better name, I shall call the micro-typal stirps, in allusion to the general run of the species composing it being of a smaller size, or, more strictly speaking, not containing such large or conspicuous insects as the others. It

is not altogether a satisfactory name, because the stirps does contain some large species, and it is not peculiar to it to abound in small ones. But, taken as a whole, its ingredients are smaller and more modest in appearance than those of the others. The fauna and flora of our own land may be taken as its type and standard.

A like tripartite basis may be traced in every class of beings. It may happen, indeed, that one or other of them, as the Brazilian stirps in mammals (Edentata &c., for example), may have almost died out; in others some former stirps, extinct in all the rest, may have survived in some isolated part of the world (as plants in Australia); but, subject to such exceptional modifications, the leading features of my proposition will be found generally applicable to all. It does not come within the scope of my present paper to show more than its application to Coleoptera; but I do not mean to deprive myself of the aid to be derived from the occurrence of a similar arrangement in other classes of organized beings, whenever I find that my position needs strengthening. In many points our materials for working out the subject are so meagre that they require every collateral aid, and it is obvious that the more widely I can show the arrangement to apply, the more will my conclusions, as to their occurrence in the Coleoptera, be strengthened.

The Indo-African stirps, as its name implies, inhabits Africa south of the Sahara, and India and China south of the Himalayas, also the Malayan district, the Indian archipelago, and the New Guinea group. This range is less modified by the general introduction of foreign elements than that of the next stirps.

The Brazilian stirps inhabits South and Central America east of the Andes, and north of the River Plate, and furnishes, moreover, a large share in the constitution of North America, but has also received in return a very perceptible tinge from the microtypal stirps.

In the microtypal stirps I include the fauna of Europe, Asia north of the Himalayas, Eastern North America, so far as not modified by the Brazilian element; and, what has less of this strain, the whole of North-west America, California, part of the Mexican fauna, Peru, Chili, the Argentine Republic south of Tucuman, Patagonia, Tierra del Fuego, Polynesia, New Zealand, and Australia.

When I first broached this view to one of my friends, I was

find in Australia the type of both the plants and beetles very much as he left them. In Europe he would find only the beetles. Indeed I am strongly disposed to claim even a greater antiquity for our present Coleopterous fauna. Some may remember that when insect remains were first found in the coal-formations, the surprise was general among naturalists at finding them so small in size and so little different from those of the present day. They expected that they should have been as much beyond the existing type in size and splendour as the Megalicthys exceeds a Herring. Nature, according to the notions of those days, was in her youth in the Carboniferous epoch, and they expected something of the extravagance of youth in her proceedings. It now seems more probable that the Coleopterous fauna there was the same *in type* then as now, and that it has continued so in the region I speak of for all the intervening period, in accordance with the rule already referred to, that the lower we descend in the scale of organization, the more persistent is the general character of the forms of which life is composed.

It is not a reply to say that the Eocene flora, which has changed in Europe, being lower in the scale of life than the fauna, should have been equally persistent. It is not lower in the scale of life than insects. They are not in the same scale at all. They are on two distinct and separate ladders; and the Eocene plants, which have changed, were high up on their ladder (the very mammals of vegetable life), while the Eocene Coleopterous fauna was low down on its. It is to be borne in mind, too, that we have every reason to believe that the changes in condition of life since the Eocene epoch have been much greater and more frequent in Europe than in Australia; and if the plants are accepted as being more likely to change than the insects under altered conditions in life, it is in Europe rather than in Australia that a change in them was to be expected.

Of course, in what I have been saying, and shall further say on this subject, I speak of the Coleopterous fauna of Australia as a whole. In one sense it cannot be disputed that it is different from that of Europe. The species are not the same, and there are a multitude of peculiar forms; but the type, especially of what I regard as the more important test-groups, such as the hunting unintroduceable species, is the same. The peculiar forms can almost always be traced back to enlargement or development of some microtypal form. Putting aside such exceptions,

the general facies is the same, and a large proportion of the genera are the same, and it will be still greater when we get rid of the feeling that the genera must necessarily be different, because they come from such a distant country. Some of the species are scarcely distinguishable from our own, and even the relative proportions of numbers of species and genera in different groups are the same.

My conviction is, that there has been certainly one, possibly two, great continental routes of communication between the northern and southern hemispheres, both now lying buried in the ocean,—the one at the bottom of the Atlantic, the other in the depths of the Pacific; and I hope, from an examination of the traces left on the ruined piers which mark the course of these ancient viaducts, to show the course that they took and the inhabitants that used them.

If any one, following in the steps of Sir Charles Lyell, objects to such a wholesale erection of continents on the ground of their magnitude, I have only to remind them of the vast extent of land which has appeared above water since the Tertiary epoch. Some drying up of the ocean during that period no doubt has taken place, but nothing sufficient to account for the immense tracts of country which have become dry land; and it is not a matter open to argument or discussion, but a mathematical necessity, that if land, previously below the water, comes above it, a corresponding quantity of land which was previously above it must then go below it.

Let us now turn to the three great stirpes, and pass each of them in review, trace their course, and determine their limits. I shall begin with the microtypal stirps (with which we are most familiar). It is the most extensive of the whole, being distributed over the whole world, with the exception of the Indian, African, and Brazilian regions; and even they, from various exceptional causes, have a greater or less tinge of it in their faunas. It contains some minor faunas, and these, again, a number of subfaunas. The Europeo-Asiatic region is one of these minor faunas, and of it the Atlantic islands, the Mediterranean, and the Mongolian are subfaunas. Taken as one fauna, the Europeo-Asiatic extends from the Azores east to Japan, the whole of that vast space being inhabited entirely by the same type and, for the most part, by the same species, a few only dropping off here and there, and being replaced by

others of the same general character. As to the Atlantic islands, the task is easy to decipher their relations; Mr. Wollaston has done it ready to my hand in his various admirable researches on their Coleoptera. It would be idle to vaunt the merits of his works to Fellows of the Linnean Society. Mr. Wollaston is one of our number, and we are entitled to regard his honours as gems in our own chaplet, if not laurels of our own growth. In interpreting the faunas of these islands, I have only to recapitulate the results of his researches; on almost every point I arrive at the same conclusions that he has done. He has removed all possibility of doubt as to the general identity of the faunas of the northern groups with that of Europe, and notably with the Mediterranean section of that fauna, or as to their individual identity with each other as members of one and the same subfauna. In the Madeiran group (see 'Insecta Maderensia' and 'Catalogue of Madeiran Coleoptera') he showed that out of 580 species, 314 are species already known on the Continent of Europe; true, he considers (in which he goes further than I would) that so many as 120 of these had been imported by man, or otherwise found their way to the islands; but, even after deducting these, he leaves 194 known European species aboriginally present, as against 266 endemic species. These endemic species, again, are all akin to the European forms, fit easily into their places among them, and all possess the facies of that fauna. I have already alluded to the want of reciprocity between Madeira and Europe in regard to any specialities they possess, and shall merely illustrate that remark by noting the fact that, although Mr. Wollaston credits Europe with a recent remittance of nearly the half of the European species, he acknowledges that no repayment in kind has ever been made by Madeira, not a single example of any of its peculiar species having ever found its way to Europe, except in an entomologist's box; and this, be it remembered, although the means of introduction have been at least as open on the return as on the outward voyage *.

In the Canary Islands (see 'Catalogue of Canarian Coleoptera')

* I know it may be replied to this that an unusual proportion of the Madeiran endemic species are apterous; but this, even although it were a good answer, would only account for the deficiency of a proportion equivalent to the relative number of apterous, as against winged species; but it is not a good answer even as regards them; for no one supposes that the introduction of species from the continent to Madeira has been by actual flight. It is floating wood and birds that are usually referred to as the vehicle or mode of transmission.

Mr. Wollaston next found that out of a total of 930 species, 224 are identical with Madeiran species, and, notably, that the same peculiar types which gave to Madeira the character of a subfauna, are also present there in force. The Cape-Verde Islands tell the same tale. Previous to the appearance of Mr. Wollaston's 'Coleoptera Hesperidum,' the usual belief among entomologists was, that the fauna of the Cape-Verde Islands partook more of that of the coast of Africa, nearest which they lie, than that of any other country. Mr. Wollaston has shown that this is a mistake. In his introductory remarks he says, "Our recent explorations in the Cape Verdes have shown their Coleopterous population to be so far more than I had anticipated on the Canarian and Madeiran type, that I am anything but certain that it would not be more natural to regard the *whole* of these Atlantic islands as characterized by a *single* fauna—unmistakably the same, even whilst necessarily differing as to many of its exact details (and through the fact of mere *distance*) in the more widely separated groups." From my own materials I rather inclined to the more general notion, and I therefore carefully tested Mr. Wollaston's conclusions by his data, and the result fully corroborated his view. Out of 275 Cape-Verde species, 91 were common to the Canaries, and 81 to the Madeiran group. The African element proved slight, as Wollaston said, and such as might fairly enough be referred to chance introductions from the opposite coast of Africa. The European element continues, as before, the staple, and a new phase of the peculiar endemic subfauna of Madeira is also a characteristic element of its fauna.

In support of the above statements, I shall merely specify one or two of the most striking of the types which are present in all the Atlantic-island groups under the same or similar forms. In Madeira the Heteromera are characterized by the presence of the endemic genera *Hadrus* and *Hegeter*, *Hadrus* having three species, *Hegeter* only one. In the Canaries, *Hadrus* has disappeared, but *Hegeter* has nineteen species, and in the Cape Verdes *Hegeter* is reduced to one, but a new form, *Oxycara*, has taken its place with ten species. In Madeira, the Curculionidæ are distinguished by a profusion of Cossonidæ containing new genera and new species in a marked degree. The same prevails in all the islands; so with *Acalles*, a small genus with few species in Europe, but with an especial redundancy in all the islands. *Atlantus* or

Laparocerus is another special new development confined to them, but present in most of them in greater or lesser numbers; thus in Madeira there are thirteen species, in the Canaries thirty-five species, none in the Cape Verdes, where, however, *Dinas*, a new Brachyderidous insect, similar to it in appearance, comes either to take its place or that of *Brachyderes*, which is also found in some of the Atlantic groups. In the Clavicorns, the remarkable genus *Tarphius*, a consideration of whose relations would require space which cannot be given here, characterizes the Canaries and Madeira, as *Attalus* does in the Malacodermata.

As to the Azores, Mr. Crotch has completed Wollaston's work for him there. As a matter of sentiment, one would have liked to have seen the whole finished by Mr. Wollaston himself, as he had done so much and so well; but the naturalist is rather ungrateful in this respect, and cares little how he gets his knowledge, provided he does get it. Mr. Crotch's contribution therefore (Proc. Zool. Soc. 1867) is a welcome, as it is a trustworthy and careful, record of the Coleoptera of the Azores. His materials are, indeed, far less complete than Wollaston's in the other islands; but although imperfect as regards proportions, they sufficiently reveal the character of the fauna. Mr. Crotch records 213 species, of which 160 are European; and among those not European, he describes a *Tarphius*, a *Laparocerus*, an *Attalus*, an *Acalles*, and a new member of the Cossonidæ—all sufficient indications of the Azores being a member of the same system as the other Atlantic islands. How the European character of this general fauna is to be accounted for, except on the supposition of a former connexion of them all with Europe, and how the presence of these special forms of the same subfauna in all the islands, and nowhere else, is to be accounted for except on the supposition that, after they were disunited from Europe, they were still united among themselves, it is for those who advocate the theory of dispersal by chance introductions to say.

The Azores seem to occupy nearly the western extremity of this ancient land; not far beyond them a deep valley, the deepest part of the Atlantic, intervenes between them and the coast of America. Up this the Gulf-stream scours, as it probably has done from early days far back in geological time; and if there is any place in the world to which we might reasonably expect a few waifs and strays to be brought by currents, it would be the Azores; and yet there are only three in this position, all Brazilian

St. Helena, that great puzzle of naturalists, is a crucial test to my hypothesis of a communication between the northern and southern hemispheres by an Atlantic continent; if that link snaps, the whole chain will fall to the ground. It will, of course, not touch the evidence for a communication between the northern and southern hemispheres by the Pacific; but a microtypal St.-Helena fauna is vital to an Atlantic communication. I say that its fauna is certainly microtypal, and if so, almost necessarily a branch of the Atlantic type of that stirps; there is nothing else microtypal within reach for it to be attached to. Some three years ago Dr. Hooker gave an admirable lecture on oceanic islands *, in which he discussed the origin of the flora of St. Helena, and on the whole seemed inclined to refer it to Africa. More in the spirit of "audi alteram partem" than from any settled conviction of my own, I wrote a reply †, in which I gave some reasons for thinking that it might more probably have been originally connected with and peopled from Europe, although also possibly connected at some period with Africa. More mature consideration and subsequent researches have confirmed my opinion; and the following examination of the character of its plants and animals will show the grounds on which I rest it.

In mammals, of course, nothing is to be expected. The only allusions to them that I can find is the statement ‡ that in cutting away the lava at Ladder Hill, many feet below the surface, small bones have been found, apparently about the size of those of a rat, and more particularly a small rib-bone entirely covered with an incrustation of stalactite. In what manner these have originally come there must ever remain a mystery: there is but one probable mode of accounting for it, on the supposition that the animal might have crept into a crevice of the rock and there died; for if a bed of lava in its liquid state had flowed over them, they would probably have been consumed, and would not have been found incrusted by stalactite. I find it also recorded in 'Baynes's Tour through St. Helena,' p. 119 (1817), that at the beginning of this century the "Manati or Manatee, Sea-cow or Sea-lion" existed in such numbers as to furnish employment for a fishery on it; and of course if the Manatee did exist there, it

* Published in 'Gardeners' Chronicle,' January 1867.

† Published in 'Gardeners' Chronicle,' February 1867.

‡ See 'Proceed. Agri. and Hort. Soc. of St. Helena,' 1826, p. 30.

would be almost proof positive of former continuity of land with some country where the Manatee lived; for it is a herbivorous animal, and could neither have crossed from South America or Africa (where different species of Manatee still live) to St. Helena as it now stands. But it is not a Manatee; the observer from whom Baynes quotes says it is undoubtedly the Sea-lion of Anson, and gives a description of it, which shows that it must have been a species of Seal, doubtless that which he supposes (the Sea-lion, or *Phoca leonina*), which also occurs at Tristan d'Acunha, and yields plenty of oil, Carmichael mentioning that one animal there will give 70 gallons.

In ornithology there is, I believe, only one undoubted aboriginal land-bird, the *Charadrius pecuarius* of Temminck, a small Plover, named the Wire-bird (probably so called from its wire-like legs). It is so exceedingly close to the Cape *C. Kittlitzii*, that it has been confounded with it by ornithologists; until lately it was shown by Mr. Layard to be distinct. The Plover (and like the others this Cape species) is a migratory bird, consequently it is not difficult to suppose that it might, in the course of its migrations, have been blown off from the coast of Africa to St. Helena. But after arriving there it must have become modified by the altered conditions of life into the *C. pecuarius*, and, among other modifications, ceased to be migratory, for that bird is a constant resident in St. Helena all the year round.

Baynes, in his 'St. Helena,' speaks of the Grenadier Grossbeak (*Loxia orix*) as an inhabitant, and says it is locally called the Wire-bird. That it is so called is certainly a mistake; but if really an inhabitant of St. Helena, it does not seem a likely one to have been introduced; and if not introduced, then it certainly is microtypal, all the species of the genus being confined to the northern hemisphere. If the Canary has not been introduced, it would be another microtypal species, and more than that, a species belonging to the Atlantic subfauna. It is, however, said to have been introduced either intentionally or involuntarily by man. It is suited to the climate, and being a universal favourite of man, nothing seems more likely than that it should have been introduced by the escape of cage-birds; but I cannot learn that the belief rests on anything more than presumption and probability; and it may be said, on the other side, that if St. Helena was once a member of the Atlantic fauna, it is natural that it should occur there, and that, although so great a favourite and universal a com-

panion of man, it is not found naturalized in any other islands, notwithstanding that hundreds exist equally well adapted to it and equally inhabited by canary-loving settlers; a sufficient reply to which may be that there is no island exactly similarly situated in regard to man's arrangements, and that other birds of a similar nature have actually been naturalized there, the Java Sparrow and Indian Haverdavats being known to have been introduced, and the fact and date of their introduction being on record. They have thriven as well as the Canary, all three being as common as Sparrows. All, however, that I wish to do is to enter a caveat against taking the introduction of every microtypal species for granted. My own belief is that there are no aboriginal birds in St. Helena: perhaps its isolation was perfected before birds appeared in the lands with which it had previously been connected. Besides the above, the Common Fowl, the Guinea-fowl, the Pheasant, the Red-legged Partridge, the Peacock, and the Pigeon have all been intentionally introduced by man.

Governor Beatson gives the names of a very few of the sea-birds found on or about the island; but their range is so wide that they can scarcely be cited as bearing on this inquiry.

The Turtle is the only reptile mentioned as found at St. Helena, but no freshwater reptiles or fishes are known; at the same time it must not be assumed that none can exist. Although there are no streams, there is water, and there are terrestrial and marsh-shells (*Succineas*); and if the advocates of chance dispersal are correct in their reasoning, small fishes from distant lands might now and then be introduced by sea-birds. It is against their theory that they have not.

Governor Beatson (*loc. cit.*) also gives a list of seventy marine fishes taken at St. Helena; but as they are all designated by their local names, it is of no scientific value. Passing it, we have a thoroughly scientific and dependable, although smaller, list in two parts by Dr. Günther, in the 'Proc. Zool. Soc.' 1868, p. 225, and 1869, p. 238, made from a collection sent by Mr. J. C. Melliss, a resident in St. Helena, to whom naturalists owe more than to any previous observer for information as to its zoology. It will presently be seen that, besides the fishes, his collection of spiders and beetles supply the most important part of our material in these classes of animals. A copy of Dr. Günther's list will be found in the Appendix. It is not to be expected that the marine fauna can be applied in the same way as the terrestrial fauna to

the elucidation of the distribution of animal life, nor does it follow that because we see certain great divisions in terrestrial distribution, the same number and the same local distribution is to be found in them also; greater latitude and extent of range must be allowed to marine animals, and especially to fishes (the birds of the sea), than to land animals. The difference in their conditions of life in the sea is less than on land. Geological changes, such as the opening of the Isthmus of Panama and the Isthmus of Suez, have a more important bearing upon their distribution than upon those of land animals, inasmuch as the opening of a door to admit a new element is more important than shutting it after it has been already admitted. The knowledge that such events have taken place, however, enables us to reconcile the occurrence of marine animals in places otherwise difficult of explanation, as, for example, *Saurus atlanticus*, both at Madeira and Zanzibar. With the help of such aids I by no means despair of being able to show that a similar distribution, in the main, exists in marine animals to that in terrestrial; not exactly placed alike, but proceeding from the same causes, and the deviations traceable to the different treatment, conditions and events to which they have been subjected. Their distribution must be studied (and happily we have the means of doing so) more in connexion with their geological history and the fossil remains of their ancestors. It is not my present business to attempt to do this; and I shall not do more than indicate the line of argument which such considerations, at first sight, seem likely to lead to. Take the Sea-perches, the Percidæ (not merely the genus *Serranus* as now understood, but the group of allied genera of which it may be said to be the type), a group containing the first dozen species in Dr. Günther's list. Beginning in the Chalk with genera which are now all extinct, increasing in the Eocene, so that half of the genera now survive and are established in the Newer Tertiary, so that all the genera now existing were then present in England, that type would appear to be properly microtypal.

The sea-shells being for the most part dependent on the lands on whose shores they live, and therefore bound to them, are safer and more direct indications of the character of these lands than the fishes; and their own stirps generally corresponds with that of the terrestrial inhabitants, although, from the causes already alluded to, they are sometimes exposed to diverging influences from which the latter are free. We have as yet, so far as I know, no list of

the marine mollusca of St. Helena. Mr. Woodward in his manual mentions that Mr. Cuming collected sixteen species of sea-shells, of which seven are new. I cannot find that he has published these; probably Mr. Lovell Reeve may have done so in his 'Conchologia Iconica,' but I have not found them. Mr. Cuming's collection, however, is now in the British Museum; and besides there are in it a number of other shells collected at St. Helena, amounting in all, with his, to about fifty species. I have gone hastily over these under the kind and able guidance of Mr. Baird; and although I should be sorry to attempt anything like the determination of the species on the strength of such a hasty inspection, yet I think I may venture to give a list of the genera to which they belong, especially as I had Mr. Baird at my elbow to advise me when I was making my notes upon them. I accordingly give a copy of my memoranda regarding them in the Appendix. On looking at this, I think conchologists cannot fail to be struck with the correspondence of the distribution of the species found there with the Coleoptera belonging to my microtypal stirps. The range of many of them is put down in our books as world-wide, just in the same way as many of my microtypal genera of Coleoptera stand as cosmopolitan, merely because they are found at distant points of the microtypal range; thus *Lucina* is world-wide because it is found on the coasts of Europe, North America, the West Indies (a debateable frontier in all classes of animals), St. Helena, Tierra del Fuego, New Zealand, and Japan (all microtypal), and its fossil distribution corresponds so far as we know it. So *Mytilus* is world-wide. Mr. Woodward's localities are "world-wide—Ochotsk, Behring Sea, Russian Ice meer, Black Sea, Cape Horn, Cape, New Zealand." Others, such as *Venus*, *Venerupis*, *Corbula*, &c., have the same microtypal habitats, with the addition of the Indian Ocean, which may have been reached through the Red Sea when the ports of the Isthmus of Suez were open. The Patellidæ, the Rissoidæ, *Litorina*, *Cæcum*, *Cerithium*, *Chemnitzia*, *Eulima*, *Nassa*, all occupy microtypal ground. It seems to me, too, that the others, which are more widely distributed, will be found to be of older geological date.

The land mollusks are of course better authorities as to the character of the fauna of the island. We have, however, no list of them, although Mr. Benson has described some of the living and Edward Forbes some of the fossil species, and also made a few remarks on them in the Geological Society's Journal, 1852, p. 197,

and elsewhere. I have therefore combined these, and shall venture to add similar notes as to the genera and a few of the species from the British-Museum collection to those which I have given of the marine species. With one exception, they are all European-looking Helices, Bulimi, Pupæ, Succineæ, and similar forms; the exception is a large semifossil *Bulimus* (*B. auris-vulpina*, Reeve) which looks recent, but of which the animal has never been found; the nearest affinities of this species have been thought by some to be with Polynesia. The affinities of the other species have been thought by conchologists, I believe, to lean most to Chili; but this I apprehend to have arisen rather from a reluctance to look for this relationship in our own land. Divested of prejudice, it is difficult to conceive anything more close in appearance to the British species without being actually identical than they are, and any greater resemblance to the Chilian species I believe to be impossible; and if it did exist, it could not go for much, for the land-shells of Chili are microtypal too, many of the Helices and Bulimi being exceeding like those of Europe; and we all know that two things which are each equal to a third are equal to each other. Others have sought to account for this close resemblance to our own species by supposing them to be modifications of species brought in the earth at the roots of plants from Britain. The occurrence, however, of so many other species in other classes like our European species seems fatal to this view.

Of other sea animals, I have to mention two species of an Annelid (*Ditrupa*), also of a northern type.

There are four Crustaceans mentioned by Governor Beatson —Shrimps, Crawfish, Stumps, and Long-legs—which by their names and the character ascribed to them by Governor Beatson, viz. that they resemble our lobsters in taste and colour, suggest our northern species; but in ignorance of what they really are, we must pass them by.

The Rev. O. P. Cambridge has lately reported on a small collection of spiders made by Mr. T. J. Melliss, and described the new species in the Zoological Society's 'Proceedings;' and he says that so far as so small a number of species (only twenty-two), of which nine were new, may justify a general remark upon the character of the Araneidea of St. Helena, it appears to bear a thoroughly European stamp, one alone belonging to any genus not indigenous to Europe. Four, if not five of them have been

recorded as indigenous to Great Britain, three to Algeria, and three to Egypt. Among the new species Mr. Cambridge found "but little to denote a locality so near the tropics." (See extract from Mr. Cambridge's paper in the Appendix.)

Mr. Cambridge also records two Scorpions from St. Helena in the same collection, *Lychas maculatus*, Koch, and *L. americanus*, Koch (American but easily introduced).

The butterflies seem as badly represented as the birds; and I would recommend to the consideration of the advocates of introduction by chance dispersal the fact that the two classes of animals best provided with means of dispersal are precisely those which, along with the mammals, are least represented. I can find no published notice of any Lepidoptera in St. Helena. No specimens of any exist in the British Museum; and the solitary species that I can learn by inquiry to have been met with is the *Cynthia Cardui* *. *Cynthia Cardui*, I need scarcely say, is what is usually called a cosmopolitan species; but in very many instances it will now be found that what have been called cosmopolitan forms are only microtypal, that is, found in every part of the world but those parts of India, Africa, and Brasil to which the microtypal stirps had not had access.

Until lately, our knowledge of the Beetles of St. Helena was limited to some twenty species or so. Mr. Wollaston has recently, however, considerably extended it, mainly through the researches of Mr. Melliss and Mr. Bewicke, and has published a catalogue (see 'Annals of Natural History,' 1869 and 1870) in which seventy-five species are enumerated. His observation upon these is as follows. "If we exclude from consideration the twenty-six species (above alluded to) which have *unquestionably* been brought into the island through the medium of commerce, and which enter into the fauna of nearly every civilized country, I need scarcely add that the St.-Helena list, as hitherto made known,

* Prof. Westwood is my authority for this, and for the sake of preserving the information he gives, I quote what he says: "As to the insects of St. Helena, I am sorry to say that I can give you scarcely any information. In one of Dr. Burchell's cabinets was a drawer filled with insects from that island, but it unfortunately had no door and had been left neglected. After Dr. Burchell's death some wretched moths got into that particular drawer and devoured nearly everything. I kept all the fragments possible, and can determine some fourteen or fifteen species of common forms, *Coccinella*, *Sepidium*, *Necrobia*, *Cynthia Cardui*. It fortunately happened that the type specimen of the curious *Aplothorax Burchelli* remained intact."

possesses nothing whatever in common with those of the three sub-African archipelagos which lie further to the north—though the great development of the Curculionideous subfamily Cossonides is a remarkable fact which is more or less conspicuous throughout the whole of them."

In this judgment I cannot concur; the list seems to me bristling with Atlantic affinities and points of correspondence. It is one of the very few instances in which I do not go entirely along with my friend Mr. Wollaston's conclusions; and I believe the difference on this occasion arises chiefly from our looking at the subject from opposite stand-points. I am looking at it as part of a larger stirps, he as an independent object. I am anxious that he and the large number of readers who, relying on his well-known judgment and acumen, will naturally accept his conclusions as their own *in fide parentum*, should see that I have strong grounds for dissenting from him; and I have therefore given in the Appendix a copy of the list of species recorded by him distributed into the stirps and faunas to which I think they belong, with full notes containing my reasons for placing them as I have done whenever any doubt seems likely to exist about the matter. On referring to this, it will be seen that, according to my view, the seventy-six species as yet recorded as inhabiting St. Helena (whether by Mr. Wollaston or others) are to be accounted for as follows. There are:—

1. Of doubtful identity and uncertain locality through the fault of the original describers ...	2
2. New endemic species which I have not seen either in nature or figured, and as to the affinities of which I am thus unable to form an opinion	2
3. Cosmopolitan or introduced, which, with two exceptions, belong to the microtypal stirps ...	13
	17

Deducting these 17 from the total 76, there remain 59 belonging to the different stirps as follows:—

South-American stirps	1
Indo-African stirps	2
Microtypal stirps, European branch...	56
	59

Of 56 members of the European branch of the microtypal stirps, I find 12 which have no greater affinity for one part of the European fauna than another, 3 which are new, but whose general affinity lies with species characteristic of the Mediterranean subfauna, 40 whose affinity is nearest to the fauna of the other Atlantic islands, and 1 (*Pristonychus complanatus*) which is generally distributed in microtypal countries, and which has hence been supposed cosmopolitan, but which in reality has not been found out of the microtypal bounds. Much of the weight to be given to this apportionment of the elements of the isle must depend on the value of my reasons which are given in the notes to the list of species in the Appendix, and to these I must refer the entomological reader. I may only say here that the instances which have had most weight on my own mind, are, 1st, the occurrence of a large *Carabus* (a hunting carnivorous genus limited to microtypal countries, which it would seem impossible to introduce except by continuity of dry land), which, according to the high authority of Prof. Lacordaire, has most affinity with species found in Syria (*i. e.* in the Mediterranean district with which the Atlantic Islands are otherwise most connected); 2nd, but of still more importance, the presence of species of genera which are particularly prominent or abundant in the other islands, as *Calosoma*, *Bembidium*, *Læmophlœus*, *Anobium*, *Opatrum*, &c.; and 3rd, and of most importance of all, the presence of new forms allied to species already known as characteristic of or confined to the other islands of the Atlantic, as *Microxylobius*, *Nesiotes*, and *Notioxenus*, representing respectively the prevailing element of *Cossonus*, *Acalles*, and *Atlantis* in them. That a particular genus is represented (however critical this genus may be), when the representation is only by a single species, is not nearly so strong evidence of common origin as common exuberance of some particular form in both faunas under comparison; for the occurrence of a single species may be explained away when the presence of many defies dispute. And I rest as much on the occurrence of the typical character of facies as on actual identity of genus or species; for in the development of new forms Nature often refuses to go by our generic characters, and produces something exactly similar in appearance but with some deviation in what the systematist chooses to call important organs, a deviation which to his mind is fatal to generic identity, but to mine insignificant in the face of persistence of facies.

So far as the fauna goes, therefore, I have little doubt that the majority of zoologists will agree with me in referring it to the Atlantic subfauna of the microtypal stirps. But when we come to the flora, we have new light thrown upon the subject. It is said to be rapidly losing its original features; when Burchell visited the island, it was still nearly in its natural condition, and out of 169 plants collected by him, 40 were endemic and very peculiar, and of the remainder, a considerable proportion seem to have been of European type. Dr. Hooker, in his lecture on Oceanic Floras, says of this, "Dr. Burchell's collection includes 169 flowering plants, but most unhappily he has not indicated which are *bonâ fide* natives and which have followed the track of man and animals introduced by him, and which have become quasi-indigenous or naturalized. Some years after Dr. Burchell's visit, however, an eminent Indian botanist, Dr. Roxburgh, visited St. Helena, and drew up a catalogue of the indigenous, naturalized, and cultivated plants then existing, carefully indicating the truly indigenous ones that were then surviving." This flora of Dr. Roxburgh's, however, is imperfect, some of Dr. Burchell's species (now in the Herbarium at Kew) not being included in it, probably having become extinct in the interval between his and Burchell's visit; and a strong desire is felt by those interested in the subject that a fresh flora of St. Helena should be published by some competent botanist. Dr. Hooker's talents, position, and acquaintance with the subject point him out as the most fitting person to do so: and I trust the general wish that he may undertake it will lead to its own fulfilment.

As our knowledge of the flora stands, however, I believe the actual facts which have been ascertained regarding it are that it contains, 1st, a considerable number of plants known to have been introduced from various countries, but chiefly from Europe; 2nd, a considerable number of European species or genera which are not known to have been introduced, but which are taken for granted to have been so on account of their European habitat; 3rd, a small proportion (but still too large a proportion to be accounted for by chance dispersal), the affinities of which are clearly with the Cape flora. Dr. Hooker's conclusion to this effect is thus stated in his lecture above referred to:—"From such fragmentary data it is difficult to form any exact conclusions as to the affinities of this flora; but I think it may be safely regarded as an African one, and characteristic of Southern extra-tropical Africa.

The genera *Phylica*, *Pelargonium*, *Mesembryanthemum*, *Osteospermum*, and *Wahlenbergia* are eminently characteristic of Southern extra-tropical Africa; and I do not find amongst the others any indication of an American origin, except a plant referred to *Physalis*. The Ferns tell the same tale; of twenty-six species, ten are absolutely peculiar; all the rest are African, although some are also Indian and American." On this sentence, while I implicitly accept its conclusions, I shall only remark:—1, that Mr. Baker, in his admirable paper on the geographical distribution of Ferns, seems to me to be a little more favourably disposed to America in his estimate of their relationship; 2, that some of the African species, as *Banksia* and *Protea*, may have an Australian significance as well as an African—not that I think that either touches Dr. Hooker's conclusion, but in trying to sum up impartially I do not wish to overlook any point; and 3, that there is besides what may be called an under layer peculiar to the island itself, and found nowhere else on the face of the globe, such as arboreal Compositæ (tree-daisies, as it were). Dr. Hooker regards these as too abnormal to have their affinities with the plants of neighbouring continents made out. I cannot think so if he will lend himself seriously to the work.

The general result which I draw from the whole flora is, that we have here a compound flora certainly two deep, possibly three deep. We have, in the first place, I believe, a genuine natural Atlantic, that is, European flora; for in the face of the decided testimony to that effect given by the fauna I cannot accept Dr. Roxburgh's conclusions as to the supposed introduction and naturalization of every species having a European habitat. If they can be proved to have been introduced, good and well; but I object to take the thing to be proved as part of the proof. And, in the next place, I believe we have the traces of an older African flora (why I call it older I will explain when I come to speak of an ancient connexion between Patagonia and South Africa); and I believe that both are due to actual continuity, however circuitous or interrupted, with the respective countries the impress of whose floras they bear.

Before leaving St. Helena, I have just one other argument to adduce in support of its former connexion with the other Atlantic islands, and that is the fact, which has only recently been ascertained, or, at any rate, only recently laid down in our maps, that there is a long band of elevated submarine bottom running north

from St. Helena to the Cape-Verde Islands, and embracing in its course Ascension Island and the shoal ground on the equator.

The next trace of a microtypal element in the southern Atlantic is the island of Tristan d'Acunha; and in obedience to the natural train of thought, I shall begin with its flora, as I have just left that of St. Helena. I should have liked to have given in the Appendix a copy of the 'Flora St. Helenica,' partly in illustration of what I have said regarding it, and also for the purpose of contrasting it with a similar list of the flora of Tristan d'Acunha given by Capt. Carmichael in the 12th volume of the 'Transactions' of this Society; for we find the same elements in both,—a mixture of European and African types in nearly the same proportion. The St.-Helena list is rather long, and I hope may soon be supplied by a better; the Tristan d'Acunha list is short, and an abstract of it may be convenient, and one is therefore given. The only shrubby plants in the island (trees there are none) are *Phylica arborea*, and either one or two species of *Empetrum*. *Phylica* is an African genus represented by two species in St. Helena; and its occurrence in both St. Helena and Tristan d'Acunha furnishes at least a presumption in favour of the two islands having once been in communication with each other and with the African continent. *Empetrum* (our Crowberry), on the other hand, is, as every one knows, a most characteristic type of the Scandinavian flora, and not less so of the Magellanic and Antarctic Flora generally. So is the genus *Chenopodium*, wild species of which also occur in both St. Helena and Tristan d'Acunha. The genus *Pelargonium* has also species in both islands: it, notwithstanding the presence of a straggler in Syria, is unquestionably African, its species in that continent being numbered by hundreds. It seems of no consequence that, as Dr. Hooker informs me, the Tristan-d'Acunha species belongs to a different section from the St.-Helena species. We should have expected that they would be different; the greater the deviation the longer the probable period since they started from common parents, and the stronger the presumption in favour of my view of the connexion with Africa being very ancient. But what must strike every one most in running their eye over Capt. Carmichael's list is the resemblance to our own flora. We there see *Ranunculus*, *Rumex*, *Cardamine*, *Atriplex*, *Gnaphalium*, *Apium*, *Carex*, and similar genera.

Capt. Carmichael does not say much about the insects, but what he does say tells the same tale as the plants,—"Three small species of *Curculio*." Thus we have, again, small *Curculios*, probably similar to those which have given a character to the Coleoptera of the other islands; with them four *Phalænas*, the old genus for the typical British Moths—a *Hippobosca* (*qu' allait-il faire dans cette galère*, where were neither horses nor other land quadrupeds for them to feed on ?),—two species of *Musca*, and a *Tipula*. Of Crustaceans, an *Oniscus*, an *Astacus*, and a *Cancer*, all characteristic types of the European fauna. Of the land-shells we may say the same; we know only two, both species of the genus *Balea*, a genus allied to *Pupa*, of which species have nowhere been met with elsewhere, except in Hungary, Norway, Porto Santo (one of the Madeiran group), and New Granada. The Norway species has also been found on the highest peak of Porto Santo. The only locality not entirely microtypal is New Granada; and of it the mountainous part is microtypal, the plain Brazilian. In which of these the *Balea* occurs I do not know; but the probability is in favour of the mountains, because the climate of the lower parts is so dangerous that it is almost entirely in the mountains that collecting has chiefly taken place.

The sea-shells and other marine objects recorded by Capt. Carmichael all have the same microtypal tinge. *Chiton*, *Cardium*, *Patella*, *Buccinum*, *Sepia*, *Echinus*, and corallines sound marvellously like the contents of one's basket after a rummage along the coast in our own country.

Have we now reached the southern limit of the ancient Atlantis? Is Tristan d'Acunha its outmost cape? Has it stretched for interminable space to the South Pole without leaving an indication of its existence? or has it trended off to the Falkland Islands and South Shetlands, and joined Tierra del Fuego, and possibly Patagonia? If there were no other way of accounting for the microtypal character of the fauna and flora of South America south of the Plata, all to the south of it being microtypal, one might feel disposed to assume that it did; and had we only the flora to go by, I should probably adopt that view, for we have in Tierra del Fuego and the other antarctic islands the very types of European plants that we have noted in Tristan d'Acunha—Empetrums, Ranunculus, Cardamine, Wild Celery, &c. &c. But I shall presently show that there was another route by

which a communication between the arctic and antarctic hemispheres was effected, and that the affinities of the Coleoptera of Tierra del Fuego and Patagonia rather point to that being the channel of communication so far as they were concerned. It may probably have been the case that there was interrupted communication between Tristan d'Acunha and these antarctic islands, which in their turn had interrupted communication between Cape Horn, New Zealand, and Australia.

Leaving this question for future solution, I shall now revert to the European fauna, of which we have only touched on the most western limit, and trace it eastward. I have already said that the whole fauna from the Azores to Japan was one and the same. No better proof of this can be given than a comparison of the list of species from one end of the continent to the other. We have no complete lists of the Coleoptera all over the country, our lists of the east of Asia being comparatively imperfect, but they are still sufficient to illustrate the identity I desire to point out. We have a list of those found by Schrenck in Amourland and Eastern Siberia, made up by Motschoulsky, and published in Schrenck's 'Reisen im Amurlande' *. We have also some similar data regarding the Coleopterous fauna of South-east Siberia, collected by Raddé in his explorations; but this is very imperfect, and relates more to genera than species. Motschoulsky's list of species found both in Amour and Eastern Siberia contains 810 species. The portion of these found in Eastern Siberia is not, however, so applicable to my present comparison as the list of species found in Amour, which extends to the extremest limit of Asia. The number of species from it, enumerated in the list above referred to, was 340; but a fuller list was published afterwards by him †, which contained 564 species; and I have made it the basis of a Table, which will be found in the Appendix, from which the range of the species composing it can be ascertained. As it does not forward this inquiry to know what particular species are limited to Amour, I have left out all in that position, except when they represent a genus not otherwise present, when I give

* I may here say, parenthetically, that Count Motschoulsky's tendency was certainly not to diminish the number of new species, but rather to increase them, so that any insect that he admitted to be the same as one previously described may, without much doubt, be accepted as really such.

† 'Catalogue des Insectes rapportés des environs du Fl. Amour, depuis la Schitka jusqu'à Nikolaëvsk, examinés et énumérés par V. Motschoulsky,' Moscow, 1860.

one species of the genus to show that it is present. I have also added a few on the authority of Raddé and others from South-east Siberia. The total number in my list thus purged and augmented is 382; but adding the number of the endemical species, of which I have not given the names, we start with 608 species known to inhabit the extreme east of Siberia.

Of these the numbers are, in

Amour	579
Dauria	297
Western Siberia, or the districts of the Ural Mountains	227
North and Mid-Europe, as distinguished from East or West Europe	213
East Europe as represented by France and Belgium	184
Britain	133
The Madeiras	10
The Azores	7

To which I may add, in anticipation of what I must presently say in speaking of North America,—

On the western side of North America	8
On the eastern side of North America	23

The details will be found in Table VII. in the Appendix.

The diminution in identity of species as we go further from our starting-point (wherever we begin) and their replacement by new strains is, it will be seen, exceedingly gradual and equal, and the proportion of identical species persisting through the immense stretch of country embracing Asia and Europe very remarkable. But what is of still more importance in this inquiry is the identity of the genera. Using the word in its large sense, the same genera are spread over the whole region in question; used in the more restricted sense, adopted by modern naturalists, a similar replacement of one form by another allied one, which we have seen occur in species, takes place also in these groups of species. Thus, in recording the species from the Amour, Motschoulsky has thought it necessary to propose a number of new genera for the new forms; and the proportion of these to the old genera found there was about a fifth. He records 239 genera, of which 85 are new. And, curiously enough, this is very close upon the numbers which Wollaston has turned out in his work at the other end of the string on the Coleoptera of Madeira: he records 236 genera, of which 44 are new.

The same fauna goes southwards through Mantchouria and Korea into China; and about Shanghai we get to the line where it meets the Indo-Malayan fauna.

We have a tolerably fair (although far from complete) notion of the Coleopterous fauna of that part of China. Mr. J. C. Bowring procured important material from that quarter. Mr. W. W. Saunders has also made some of its species known; and latterly Mr. C. W. Goodwin, Assistant Judge of the Consular Court of Shanghai, has sent some important collections made in the immediate vicinity of that city to one of our London entomologists, M. de Rivas, who, I trust, will ere long give to entomologists a catalogue of the species. In the meantime these materials (which I have had the advantage of studying) show that the Coleopterous fauna of Shanghai is a mixture of a few Indo-Malayan types (such as *Copris molossus*, *Euchlora viridis*, *Cerosterna punctata* variety) with a mass of smaller species mainly belonging to the Europeo-Asiatic fauna; some identical with European species, the majority new species of the same type. A small collection of Coleoptera made by Dr. Collingwood at Formosa, which he has been kind enough to show me, exhibits the same mixed fauna, and of nearly the same kind and proportions.

An exactly similar intermixture occurs on the opposite coast of Japan; but what is most remarkable is, that although it occurs in the Beetles, Butterflies, Bugs, &c., it does not occur in the Hymenoptera. The great majority of the Beetles are of the Europeo-Asiatic type, and a certain proportion (as in Amour) are identical with, or only very slightly different from British species; the minority consists of species of the Indo-Malayan type, and indeed of the identical species which occur at Shanghai (*Copris molossus* and a variety of *Cerosterna punctata*, being two of the most prominent insects in both). But the Hymenopterous fauna is not of this mixed character; it is entirely Chinese. Mr. Frederick Smith, our first authority on the Hymenoptera, and who, from his position in the British Museum, has unusual opportunities of observing collections from all quarters, tells me that he has never seen a Hymenopterous insect from Japan of other than the Chinese type. It is the only class of insect, so far as I know, in which this deviation from the typical character observed in others occurs. Why should this be? Is there any peculiarity in the life of the Hymenoptera which can account for it? The only one I know of is, that one large section of them

(the Bees) are dependent on flowers for subsistence in the larva state; and supposing the cold of the glacial epoch to stop the flowering of plants in Japan without killing the plants, the bees might be exterminated while the other classes still survived. Were Japan, therefore, separated from the mainland, so that on the restoration of a milder climate no fresh supply of species could be received from the north, and united to Southern China, so that it received its new inhabitants from it, and then finally separated from it as it now stands, we should perhaps have an explanation of the actual phenomena as regards bees; but there are other Hymenoptera to which this explanation will not apply, and further research may show that the exclusion of northern types is not so rigorous as at present appears. At any rate, it seems to me that if the whole earth might be replenished by chance colonization, then the presence and absence of particular classes of insects in Japan is without explanation.

I presume it will not be necessary for me to show that the same distribution prevails throughout Europe and Asia in every class of animals; Dr. Sclater was the first to do so in the birds, I have elsewhere done the same for the mammals. Dr. Günther has done it for reptiles, Gabriel Koch has done it for the Lepidoptera, Meyen and Hooker for plants. In fact every person is at one upon it, each in his own speciality.

The Europeo-Asiatic Beetle-fauna * does not stop even at Japan; it passes over into North America by Behring's Straits, or rather, I should say, it is found in North America on the other side of Behring's Straits. In Russian America we have a fresh crop of Europeo-Asiatic forms, genera and species; and here another noteworthy circumstance presents itself. It is generally taken for granted that there is a uniform homogeneous arctic fauna which extends all round the arctic circle. It is so, and it is not so. It is so on the large scale, but not so on the small. The arctic fauna is subject to the laws of spreading by continuity and stoppage by barriers just the same as any other fauna. I have elsewhere endeavoured to show that the mammalian fauna of Greenland is Europeo-arctic as distinguished from Americano-arctic. I maintain that the homogeneity of a fauna

* I was unable, in my 'Geographical Distribution of Mammals,' to adopt Dr. Sclater's terminology of Palæarctic, Nearctic, &c., because we did not agree in the extent and limits of our regions; and now, of course, in this paper I can still less do so, as a principal effect of my hypothesis, if it be sound, must be to still further break down their limits and destroy their solidity.

depends on other causes than uniformity of condition of life within its limits. I cannot doubt that if there had been an isolated communication between the Indo-African districts and the North Pole, we should there have had a fauna related to and developed out of that fauna, and wholly distinct from the other faunas of the arctic regions. It is continuity of soil or freedom of intercommunication which has produced the present uniformity of fauna in the arctic regions; but where minor interruptions exist, or old barriers or conditions equivalent to a barrier formerly existed, there are also subdivisions in the character of the fauna, and in the position of these minor divisions we see the operation of these laws and are able to trace the existence and former position of the barriers. Thus we find two minor subfaunas in Arctic America, an eastern and a western one. Two causes may have produced these. One of these may have been the sea which, it can scarcely be doubted, formerly existed between the Gulf of Mexico and the Polar Sea, in the line of the Missouri and Mackenzie rivers; another may have been that the ground now occupied by one of these subfaunas was under water at a later period than the other, so that it was peopled at a different date from it. Probably both contributed to produce the present arrangement of the subfaunas to the east and west of the Mackenzie River. That there was a barrier there, and that that side was still supplied with the same general type (though with minor deviations), is to be explained by their having received their species from the same general stock, but coming to it from different directions, the one from the east, the other from the west. That the minor differences to which I allude are, in the case of North America, to be referred to this cause, and not to mere gradual increase of variation arising from increase of distance, seems to be a legitimate inference from the fact that while the whole of the north of North America, without exception, belongs to the Europeo-Asiatic type, there are a number of European genera which occur in North-east America, and not in North-west, and *a few which occur in North-west, and not in North-east America.*

In the Appendix I have given a list of genera of Coleoptera which inhabit both sides of the Pacific, and do not occur in the Atlantic States of the American Continent, and also of a list of some species of other genera, similarly distributed. These are almost literally taken from my friend Dr. Leconte's Reports in

the 'Pacific Railroad Reports,' 47th parallel, and on the Coleoptera of Kansas and Eastern New Mexico, as verbally corrected by him for me down to the most recent date, and only one or two being added by myself. Some of the genera or species in these lists may yet be met with in Eastern America; but after making allowance for this, enough would seem still to remain to warrant us in holding that a certain proportion of these must have reached America *viâ* Siberia, and that, in like manner, most of those in the Eastern North Atlantic States have probably originally come *viâ* Europe and Greenland.

North America has no special fauna or flora of its own. That which it has is a mixture of the microtypal and Brazilian stirpes intermingled with fresh importations of different dates, and modified by the advance and retreat of the glacial epoch; but, on the whole, the preponderating element in its fauna is the microtypal. What I am now pointing out with regard to Beetles may be traced to a greater or less extent in every branch of zoology and botany. I could go over each, pointing this out; but I will wait until the fact is disputed. Its origin is of very old date, the elements now respectively found in Europe and America having been already settled in each country before the Miocene time. Professor Heer's admirable papers on European fossil Tertiary insects give us the means of inferring this, and at the same time furnish arguments against his and Professor Unger's scheme of the Miocene *Atlantis*, which they held to have united Europe to America in the line of the Azores, and which, they think, served as a bridge for the intercommunication of the plants and animals in the two continents. That there was formerly a continent in the Atlantic is, I think, proved to demonstration by the facts already mentioned regarding the faunas of the Atlantic Islands. But that it reached America is gainsaid not only by the facts adduced in Professor Oliver's able paper on the subject, published in the 'Natural History Review,' and by those of other able naturalists, a *résumé* of which I have already given elsewhere ('Geographical Distribution of Mammals'), but by the examination of Heer's lists of species, to which I am about to refer. If the reader will turn to the Appendix, he will find in one of the Tables a list of all the genera of Professor Heer's 'Miocene European Coleoptera,' with the exception of a very few, which he could not refer to known genera, and which I have omitted. In that list I have noted in columns

opposite to each genus the different countries in which they are now found; and the result shows, first, that all these Miocene genera, excepting such as are universally distributed, are now confined to my microtypal regions; and, secondly, as regards Europe and America, that among them are plenty of genera which now inhabit both Europe and America, but not one that now inhabits America and does not inhabit Europe, while there are a few well marked and characterized forms, as, for example, *Pœlobius*, *Capnodis*, *Microzoum*, and some others of less marked distinction, as *Perotis* and *Eurythyrea*, which now inhabit Europe and do not inhabit America. This is as strong evidence in kind (I do not dispute that it might be stronger in quantity, that is in number of forms), but it is as strong in kind as a fossil collection from one country alone could give, that the same distribution which prevails in these two continents at the present time, prevailed already in the Miocene epoch. The genera which are now peculiar to Europe were then peculiar to it, and, consequently, the inference is strong that no communication between the two countries has ever existed since the days when these fossil insects were in life. If we had an American collection of the same age in which types now peculiar to America were found, the evidence would of course be still stronger, but it would be repetition of what we have already observed in Europe. The same relations between the American and European Miocene species are to be found in other classes. I give a somewhat less elaborate (as regards number of regions) list of the distribution of all the other existing genera of insects recorded by Heer and Krantz, not only for its bearing on this inquiry, but in the expectation that it may be convenient and useful to other students of geographical distribution to have such a list at hand. The Hemiptera have been gone over for me by Mr. Dallas, our first authority on that branch, and the table and notes embrace the information derived from him, although he is not responsible for it all, his attention having been only specially requested to Europe and America. In that table it will be seen that the Miocene genera *Prostemma*, *Nepa*, and *Diplonychus*, and in the Homoptera the genus *Tettigometra*, are now found in Europe and not in America, and that one or two instances where the reverse seems to be the case are due to modern alterations on the genera used by Heer. In the Diptera it will be seen that all the genera are both American and European.

The above are not the only points in which Professor Heer's Miocene species lend important help to the student of geographical distribution. They are of essential assistance in determining the southern limit of the microtypal stirps in Europe and Asia, and whether some of the forms which are found in the southern part of the European range really belong to it, or are immigrants from the African or Indian region lying to its south. The South-European fauna is composed partly of the same species as that of the districts more to the north, partly of distinct species of the same genera, and partly of what may be regarded as modified forms of the same general stock, but having a considerable effect in altering the facies of the fauna. Besides these, there are a few (perhaps in all not more than ten or twelve) species which have probably sprung from the African stirps, and established themselves in Europe by immigration. The southern limits of the fauna of this region, which extends along the bed of the Sahara onwards to the Caspian and Mongolian Steppes, are the deserts of the Sahara, which cut it off from Europe, and the Himalayan range, which divides it from India and China. As regards the Sahara, it is its southern border which is the limit. Its bed seems to have been raised by a force operating from the north. The strata, abutting on the Atlas mountain-range, rest inclined on its flanks as if tilted up by it. The effect of this elevating force operating in the north would, of course, be to raise the part of the Sahara nearest it first out of the water; the last vestige of the sea would be at the south, consequently the bed to the north would be first colonized, and it could only be so from the north. The facts of geographical distribution quite correspond with this view. The fauna and flora of the desert is Mediterranean, not Senegalese.

Returning to the Asiatic terminus of the microtypal stirps, let us now endeavour to trace its further course. The genus *Blaps*, which is a characteristic feature in the Coleopterous fauna of Central Asia, will furnish us with the means. It may be taken as a representative case applicable to other species also, although it certainly is the most striking instance which occurs to me. Upwards of 100 different species of *Blaps*, out of a total of about 150, have been described as inhabiting the country between Southern Russia, Mongolia, and Mantchouria. Now if we cross to California in continuation of the same line we have not *Blaps*, but we have *Blaps's* brother, and he has been a twin. We have

Eleodes, its perfect counterpart and representative; and it is to be observed that while the facies of the species actually inhabiting California is entirely that of *Blaps*, a number of species which are found in Kansas and on the eastern flanks of the Rocky Mountains have a somewhat different facies; and I should add that the supposition that these are stragglers from the Californian shores is strengthened by the fact that the genus does not occur to the east of the Missouri: other Heteromerous forms, reminding us of Mediterranean and Asiatic species, occur in California, and the whole of the north-west of America has a greater preponderance of the microtypal stirps than perhaps occurs east of the Rocky Mountains. The Brazilian element is less sensibly present, such Brazilian genera as *Passalus*, *Dynastes*, *Monocrepidius*, *Macrodactylus*, *Dichelonycha*, *Phanæus*, *Gymnetis*, &c. being absent in California, although present in the Eastern States. M. Candèze, in his work on the Elateridæ, notices that *Meristhus scrobinula* is found both in Mexico and China, and adds that he has found other species common to these countries, notwithstanding their distance from each other (Candèze, 'Elateridæ,' i. 165). Other facts in other branches of natural history lend strength to the idea of a former communication having existed between Asia and California. For example, in Mammals, there is a peculiar genus of Moles, *Urotrichus*, which has not been met with anywhere but in Japan and California. In plants, the botanist will remember that the Coniferous subgenus *Pseudostrobus*, so abundant in Mexico and California, in the Old World reappears in Japan, and only there. The Menzies and Douglas type of Spruces does the same, species almost identical with them occurring in Japan. The *Chamæcyparis* of California is only another name for the *Retinospora* of Japan; and among herbaceous plants similar relations can be pointed out. In the Sandwich Islands, again (so far as we know, which is not so much as we wish), which from their position may probably have been part of any northern land which formerly existed in the Pacific, as well as, at some period antecedent or subsequent, a part of Polynesia, the same character of fauna is present. Among the Lepidoptera we have *Sphinx cingulata*, Linn., or what is scarcely distinguishable from it, it in its turn being the scarcely distinguishable American representative of our own British *Sphinx convolvuli*. The only Coleopterous genera which I know from them are *Anchomenus*, *Colymbetes*, *Agabus*, *Hydrobius*, *Hete-*

rophaga, and *Dryophthorus* (*Calandra*), all of which are certainly microtypal.

Next step to the south of California comes Mexico. It also is largely supplied with *Eleodes*; and although some of the finest and showiest non-microtypal Coleoptera in the whole world come from Mexico, they have no bearing on this part of my inquiry; for they come from parts of Mexico which are in direct communication with another stirps, the rich Coleopterous fauna of Brasil and Venezuela; and the vast multitude of small European-looking species which occur on the high lands and western side is quite sufficient for my purpose. The collections made by Truqui in Mexico show this thoroughly microtypal character in a very marked way, Staphylinidous genera, such as *Falagria*, *Homalota*, &c., abounding. Mexico, being a sort of halfway house between Europe and Australia, might be expected to contain species both from the north and the south which have got thus far. *Eleodes* is an instance of this from the north, *Philonthus* another; both reach as far as Chili, but not into Australia. *Zopherus*, on the other hand, is an instance of a species which occurs in Australia, and runs up into Mexico, where it is in strength, and goes even a little further. Mexico may, indeed, have been its starting-point, but the connexions and relations of it and the allied genus *Nosodendron* decidedly indicate a separation between the eastern and western type of both; and the western type extends into Australia and New Caledonia.

Between Mexico and Peru, west of the Andes, there is a considerable space, as to which more information must be obtained in every branch of natural history before we can satisfactorily dispose of this question. There have been many collectors in it, but they have usually hurried to the interior and across to Columbia and New Granada; and I have seen no coast-collection of Coleoptera, nor do I know of any published lists. From the mountains themselves we have, however, received very considerable collections. Thanks to Professor Jameson, of Quito, we have a fair knowledge of the Coleopterous fauna of its neighbourhood. That of Bogota also is pretty well known. From these I can say that they consist of a mixture of microtypal with Columbian forms, in which the Columbian predominate; but the microtypal is represented by undoubted members of that stirps, such as *Graptodera*, *Philonthus*, small Harpalidæ, &c. Of other classes of animals the birds are best known, through the exertions of Messrs. Fraser and Salvin;

and, as it seems to me, there is a similar mixture of stirps in them. In such an inquiry as this, however, birds would require a special examination for themselves, their power of flight, and, still more, their migratory instincts, complicate their distribution so seriously. To do so fairly, the main distribution would require to be taken, in all doubtful cases, as the test of the stirps, leaving exceptional deviations out of view, whether they can be accounted for by exceptional causes or not.

Passing southwards to Peru and Chili, the number of Europeo-Asiatic genera diminishes, but the general facies still remains. The Chilian species in many cases belong to European genera, and the general facies is of the same character. *Blaps* still shows itself, only it has now passed out of the form of *Eleodes* into that of the smaller *Nycterinus*. The genus *Carabus*, which was lost in Mexico, has here retained its footing; it is found in great beauty in the Chilian Andes, although very limited in number of species. *Carabus* is a genus almost entirely confined to Europe, Asia, and North America. Africa proper has it not; India has it not; and, although it goes against my argument, I must in honesty add Mexico appears not to have it. St. Helena, the Chilian Andes, and Australia are the only places in the southern hemisphere where it occurs. In Australia the genus has undergone some modification (into *Pamborus*), and in St. Helena (into *Haplothorax*), but still true scions of the *Carabi*, and bearing all their facies. The *Feroniadæ*, too, which form a very characteristic element in the European and American faunas, are fairly represented in Chili, strong in Australia, and absent from Brazil, Africa, and India, except in places which of themselves suggest that they are emigrants from over the border. Such are the species in South America from the mountainous parts of Columbia, or in India from both sides of the Himalayas; *Pristonychus complanatus*, a European species, seems to beat all others in the possession of "an undergoing stomach to endure whatever may ensue." It occurs in Chili and also in the Canaries and in St. Helena. Another somewhat remarkable form is the genus *Thalassobius*, beetles which live under high-water mark; it belongs to the Trechidæ, which seem peculiarly adapted for trying strange modes of life, and peculiarly open to the impression of altered circumstances in them, turning into *Anophthalmi* of various kinds in dark caverns, into *Æpus* and *Thalassobius* under the sea. *Æpus* is the form they have taken under high-water mark on the coasts

of Europe, *Thalassophilus* at Madeira, *Thalassobius* at Chili; and the late Mr. Wm. Sharpe Macleay informed me, in a letter written not long before his death, that he had found a similar species on the shores of Australia. Not then having my eyes open to the true significance of the occurrence of those species in these localities, I considered that probably they would be found on all coasts. I do not expect this now. I imagine they will be found confined to the coasts of the lands to which my microtypal stirps extends; and, in point of fact, they have not as yet been found anywhere else.

The distribution of the blind-cave Coleoptera is very remarkable. In the caves where they occur in Europe (chiefly in Carniola, Hungary, Corsica, and the Pyrenees) almost every new cave produces a new species closely allied to, but distinct from, those in the nearest caves; but more remarkable still, the Mammoth Cave of Kentucky produces a species of *Anophthalmus* so close to the Carniolan species that it is only on examination that one sees they are distinct. The *Anophthalmi* and their allies are carnivorous, hunting beetles, and, as I have just said, their parent type seems to be *Trechus*; but the same thing occurs with another totally different type, *Adelops*, a clavicorn allied to *Catops*. Not only in the different caverns and also under moss and in dark places do different species of this occur, but again in the Mammoth Cave of Kentucky it reappears side by side with *Anophthalmus* in an all but identical form there.

And here, while upon the cave-insects, I may remind the reader of the blind Reptilia and Crustacea of which allied forms occur in the European and American caves; and I would also draw their attention to a lately described form of cave-locustrian which has a distribution still more in accordance with the range of my microtypal stirps. One species occurs in caves in Europe, another in America, and a third in a limestone cave at Collingwood, Middle Island, New Zealand. They were at first described under different generic names, it being supposed, probably from the distance of their localities, that they must be distinct; but Mr. Scudder, the eminent American orthopterist, has shown that all three belong to one genus, which he has named *Hadenœcus*. Although they inhabit the deepest parts of the caves, they are not blind, but have the long legs which seem characteristic of the Anophthalmi and Cave-Araneidæ.

In the Elateridæ the characters are slender and often artificial, and so not well adapted for the elimination of questions of geo-

graphical distribution; but even in them we can satisfactorily establish the presence of the microtypal element in microtypal lands, and its absence elsewhere. Take the genus *Elater* proper. In it, of fifty-three species, twenty-three occur in the Europeo-Asiatic district, twenty-five in North America east of the Rocky Mountains, two in New Holland*, and if we unite to it the genus *Grammophorus*, which has quite the facies of *Elater* and stands next to it, we must add four from Chili.

In the Buprestidæ the genus *Stigmodera* is often quoted as a striking illustration of affinity of animal life between Chili and Australia. It is impossible to dispute the absolute identity of their type; they do not, however, pass further to the north than Peru.

Anthaxia is another type whose distribution corroborates my hypothesis. It is all but absent from Africa, India, and Brazil, or only very sparingly, and not very characteristically, represented by one or two species at the Cape of Good Hope or in the Malayan region; but in Chili it is so identical in appearance with our European species, that I remember when I first got some Chilian species I put them aside as obviously ticketed with an erroneous habitat. They also occur in Australia, although the species there are not so absolutely European in appearance.

A not less striking resemblance between Chilian and European species occurs in a heteromerous genus from Mendoza, at the eastern foot of the Andes (*Cacicus americanus*), which is so exactly a large counterpart of *Elenophorus collaris* from the Mediterranean, that I hold it to be perfectly certain that if both had been found in the same locality, only one genus would have been made for both. It is an out-of-the-way-looking genus, and no other example of the form occurs anywhere else on the face of the earth, so far as is yet known. The Scauridæ present similar South-of-Europe resemblances.

The Gallerucidæ, a family which is represented by different forms in the different regions where it occurs, are represented in the Europeo-Asiatic regions by the Halticidæ. These are very numerous also in Chili. The genus *Lithonoma*, of which only two species have hitherto been described (one from Spain), reappears in Chili, from whence I have received a species not yet described. In *Cryptocephalus* again, although the type leaves very

* One is recorded as having come from the East Indies, without more precise indication; but as that word generally includes the Himalayas, which are half Europeo-Asiatic, the locality cannot be counted either way.

little room for change in appearance, there is a certain difference between the Indo-African species and the microtypal. Brazil has only two or three of its own, and they have, to all appearance, been derived from North America or the west of the Andes. And there is again a difference between the European microtypal and the North-American microtypal, the latter having a facies of their own, which is shared by the Chilian and Peruvian species, and also in a less degree by the Australian.

In the Cassidæ we have the well-marked North-American genus *Porphyraspis* running down into Chili. In the Coccinellidæ, the *Hippodamias* (with the exception of one straggler in the Brazilian region, and one or two on its borders near Quito and Bogota) are entirely confined to the microtypal range, Chili being its southern limit, but it has not been met with in Australia. *Coccinella* proper, however, which has a similar range to *Hippodamia*, occurs there, and one or two stragglers have also found their way to the Cape, and one (*C. transversalis*) to the Malayan region.

The microtypal stirps in the southern extremity of South America is divided into two subfaunas by the Andes: that on their western flank is merely a continuation of the fauna of Western Peru; that on the eastern flank is cut abruptly off on its northern margin by the river Plata, where it meets the Brazilian type. The demonstrated history of this country sufficiently explains this distribution. Mr. Darwin in a few lines tells it thus: "The landscape has one character from the Strait of Magellan along the whole eastern coast of Patagonia to the Rio Colorado; and it appears that the same kind of country extends northerly in a sweeping line as far as San Luis, and perhaps even further. To the eastward of this line lies the basin of the comparatively damp and green plains of Buenos Ayres. The former country, including the sterile *traversia* of Mendoza and Patagonia, consists of a bed of shingle worn smooth and accumulated by the waves of a former sea; while the formation of the Pampas (plains covered by thistles, clover, and grass) is due to the estuary mud of the Plata deposited under a different condition of circumstances." (Darwin, Journal, p. 402.) In those days the water came quite up to the mountains on the western as well as the eastern side; for we learn from the same source that "the valleys in the Cordillera are filled with an immense thickness of stratified alluvium, which in all probability was accumulated at the bottoms of deep arms of the sea, which, running from the inland basin, pene-

trated to the axis of the Cordillera in a similar manner to what now happens in the southern part of the same great range."

There seems no reason to doubt that Patagonia and Chili were both supplied with their present faunas and floras from the main microtypal stock on the Andes. It is natural that from them the newly exposed sea-bottoms should have been peopled as they appeared, and quite in accordance with this that the stock flowing off to the right hand and the left should, while retaining a common character, have each respectively minor peculiarities. This is what we should expect, and this is what we find. In both we find the same forms of microtypal Carabidæ, *Cnemacanthus*, *Harpalus*, *Antarctia*, &c., the same modifications of Heteromera, as *Nyctelia*, *Cardiagenius*, *Praocis*, &c.; and in both the fauna, as a whole, is remarkably scanty.

In Patagonia, however, there occur one or two forms whose presence it is not easy to account for. The genus *Eucranium* occurs, not on the desert-plains between the mountains and the sea, but at Mendoza, at the foot of the eastern flank of the Andes, where the plains begin to rise into the desert base of the mountains; for notwithstanding the advantage of water from their snowy peaks, the coarser shingle at the base of the mountains maintains its sterility equally with that of the less-watered finer shingle at a greater distance from them. Now *Eucranium* is undoubtedly the representative of the Caffrarian genus *Pachysoma*, which is one of the Ateuchidæ, or pill-rolling beetles of Africa and India, the ancient *Scarabæus* of the Egyptians; and if this were a solitary case, I might perhaps have tried to get over it by arguing that although the *Scarabæus* is certainly an Indo-African form (being found both in India and Africa, and in preponderating numbers in Africa and all over Africa), it might yet have originally been microtypal because it is found in the Mediterranean district, not only in Egypt, Algeria, and Barbary, but also in Italy, Greece, &c., and from thence might have extended into Africa. But against this is the fact that *Ateuchus* is not found in Heer's lists of Miocene species, although *Gymnopleurus*, another pill-rolling beetle, whose distribution is similar to that of *Ateuchus*, is recorded there. The latter fact may be only an earlier instance of what has taken place in *Ateuchus*, or it may refer to some more ancient state of things; for all Coleoptera have no doubt been originally connected: but the connexion of *Ateuchus* with Europe is not the immediate point; it is the connexion between one of its

South-African peculiar forms and a closely allied form in Patagonia. Any doubt, however, that I might feel vanishes when I find other African forms or their representatives in Patagonia. In the Straits of Magellan has been found *Agrius fallaciosus*, a hunting carnivorous beetle, an undoubted relative of the South-African *Manticora*; and although cavils might be made against it on the score of the occurrence of one or two other allied forms in the continuation of the Andes in North America (*Amblycheila* and *Omus*), we have another stronger case still in the presence of the Rhea or South-American Ostrich. It could not be cast on the Patagonian shores by flotsam or jetsam, it could not fly over the intervening ocean; in fact, it is as strong a case implying actual continuity of soil as could be made up were one intentionally to try to contrive one. The concurrence of these three settles the point of their each being genuine instances of the presence of a South-African element only to be accounted for by continuity. The question then comes to be, Where and when did this continuity exist? As to the when, it seems clear that it must have been prior to the appearance of the Pampas and the plains of Patagonia above water. The specimens of *Eucranium* have all been obtained, not on the desert-plains or on their margin near the sea, but on the other inland side of these deserts at the base of the eastern side of the Andes, in the deserts of Cordova, in the neighbourhood of Mendoza. Both the African *Scarabæus* and its Patagonian representative are desert insects, and all Patagonia between the sea and the mountains is apparently sufficiently fitted for it; so that if it had arrived from Africa after the land had assumed its present configuration, it ought to have been found on the coast and on the plains rather than beyond them on the now dry shores of this ancient sea-bottom. I infer that it was there before the sea-bottom emerged, and has not yet spread far from the spot it occupied or escaped to on the occasion of that event. The reason why it has remained thus stationary, and not gone back as soon as it had the power, by the reappearance of dry land, into its former ground may be that its constitution had undergone a change when its conditions of life were altered. Perhaps until then it was a mere *Pachysoma*, as at the Cape of Good Hope, but under the new conditions changed into *Eucranium*; or it may be that in the struggle to obtain a footing on the reappearing land it was distanced by other species more speedy in their invasive movements or better suited to the locality.

I suppose I may assume that if the present position of *Eucranium* is due to a former union of Patagonia with Africa prior to its existence, the same conclusion applies to *Agrius* and the Rhea. We do not require a separate *Deus ex machinâ*, a separate junction of Africa and Patagonia for each of these desert species. Had any of them been of a constitution inconsistent with existence in a desert, we might have had to do so; but all three being by nature denizens of that kind of country, one explanation, one resource will do for all.

The next question in relation to them is in what direction the union of land lay by which the species travelled from Africa to South America, and by what route they reached their present locality. They may have come *viâ* the South Pole or Cape Horn, and having been established in a southern (now vanished) land, spread north to their present locality; or they have come in by Brazil and spread south to it; or their present habitat may be merely the inner margin of a wider former stretch of plains reaching all the way straight across the Atlantic. It may be that a former land once existed there where the plains of the Pampas now lie. The present Patagonia may not be the first of the kind, although the first of the name. This may be actually Patagonia the second, or, for aught we know, Patagonia the third. Mr. Darwin tells us of what must have been more than one previous Patagonia submerged and destroyed. "It required little geological practice," says he, "to interpret the marvellous story which this scene at once unfolded." (He is looking at some petrified trees on a bare slope of the Andes at an elevation of 7000 feet, near Mendoza.) "I saw the spot where a cluster of fine trees had once waved their branches on the shores of the Atlantic when that ocean (now driven back 700 miles) approached the base of the Andes. I saw that they had sprung from a volcanic soil which had been raised above the level of the sea, and that this dry land, with its upright trees, had subsequently been let down to the depths of the ocean. There it was covered by sedimentary matter, and this again by enormous streams of submarine lava, one such mass alone attaining the thickness of 1000 feet; and these deluges of melted stones and aqueous deposits had been five times spread out alternately. The ocean which received such masses must have been deep; but again the subterraneous forces exerted their power, and I now beheld the bed of that sea forming a chain of mountains more than 7000 feet in altitude." (Darwin, 'Journal,'

p. 406.) It was by that pristine Patagonia that these African relics must have reached their present place of abode, and it must have stretched out until it reached the Cape of Good Hope, sending out perhaps arms to Tristan d'Acunha and St. Helena, which, however, have the option of, what I think, a still more ancient union in another direction, as to which I shall have something to say when I come to Brazil and Madagascar. Judging from the character of the species preserved, we can guess at the character of the land uniting the two continents. It must have been a country much of the same general character as Caffraria, perhaps more flat and desert, and, like it, thinly clothed with vegetation. If it were not, then surely some trace of the African flora would have been left on the Andes. When it sunk again, all visible traces of its existence sunk with it, except perhaps the Rhea and beetles (and possibly one or two other animals which have escaped my recollection or, as yet, the researches of travellers) which happened to be left on the shore when the ground in front of them disappeared, the score or so of plants left on St. Helena and Tristan d'Acunha, and a slight sprinking of microtypal forms which still subsist at the Cape. That there should be such a trace at the Cape is, I think, essential to the hypothesis, always provided that the microtypal stirps had then reached the Patagonian Andes; for although from the physical nature of the country at the Andes a whole continent might sink out of sight quite up to its walls, carrying its population with it and leaving almost no trace behind, there is no similar barrier at the Cape. Some of the population of the submerged land must have either already settled in the country or escaped from their own land when it sunk. It may be that the microtypal stream had not yet reached Patagonia, that it arrived there, *viâ* the Atlantic islands, subsequent to this event. Mr. Darwin mentions that Mr. Brown determined for him the petrified trees above mentioned to be Araucarias; but this does not settle the question, for although coniferous trees are certainly microtypal, the Araucarias may have come from Brazil of an older date. I shall, under the head of Polynesia, notice the arguments, *pro* and *con*, as regards the character of the *Araucaria*. That Caffraria has a slight tinge of the microtypal element is certain; but it may have received it from Australia, as an affinity indicative of an ancient connexion between the Cape and the south-west of Australia has been sufficiently proved in plants, mammals, birds, as well as in insects. In

favour of this Australian connexion having been the source of the microtypal Coleopterous element in Caffraria, it may be said that it seems to be most pronounced on the eastern coast of South Africa; against it that the element, if filtered through Australia, should have been more modified from the original northern type than it seems to be.

So far as regards the submerged Patagonian continent in question, I think we may, from the paucity of the traces left of its inhabitants, come to the conclusion that its duration, as compared with that of other continents, had not been long. It must have taken a long time for insects slowly to have spread from Africa to South America; but it seems to me that where there are no exceptional causes of fertility (as where a limestone or chalk sea-bottom was upraised, which I imagine, from being composed partly of organic matter, would be more speedily fertilized), where, for example, the bottom was sandy or shingly, as in Patagonia, or sandy, as in the Sahara, and where there is no water running through it, the process and rate of rapidity of clothing it with soil and vegetation must, *cæteris paribus*, be nearly the same in all, and that we may form an estimate of the comparative age of a country by the degree of fertility of its deserts. Thus I should suppose the Kalahari desert, which, although called a desert, is not wholly a waste, but studded with tufts of plants, must be older than the Salt-Lake deserts in North-west America, which are only beginning to get a widely scattered dotting of sage plants, and these deserts again to be older than the Sahara, which has no vegetation at all upon it. It is true that the conditions of the Sahara are exceptionally unfavourable; but I take it there is some truth under the idea. So judged, the Patagonian continent could not have been proportionately far advanced, judging from its inhabitants, when it again sunk out of view.

Polynesia has hitherto been an entomological puzzle; and one of our most eminent British entomologists lately told me that after poring over the lists of its species and making them up into tables on various principles, he had at last been driven to the conclusion that they were composed of the sweepings of the whole world, and that there was no other way of accounting for them but by the supposition that the Pacific islands have had a dip under the sea long enough to kill all life, and that what was now found on it was derived from subsequent colonization after their reappearance, drawn, like its sailors, from all quarters of the globe.

Under my theory the Pacific Islands lead to no such inference. We must bear in mind that we have two distinct kinds of islands to deal with in the Pacific—the coral islands, like Keeling Island, the mountain-islands, like Tahiti. The coral islands are in the case described by my friend; the mountain-islands are not. What Darwin says of Keeling Island is no doubt true of all the coral islands:—"As these islands consist entirely of coral, and at one time probably existed as a mere water-washed reef, all the productions now living here must have been transported by the waves of the sea. In accordance with this, the flora has quite the character of a refuge for the destitute; Professor Henslow informs me that of the twenty species, nineteen belong to different genera, and these again to no less than sixteen orders"; and these nearly all "common littoral species in the East-India archipelago" *. The animals on that island were a rat, one or two wading or sea-birds (obviously stragglers), a small lizard, some spiders, and thirteen species of insects of different orders,—viz. of beetles, one minute Elater (the reader will remember that of the three beetles introduced in the Azores from Brazil, two were Elaters, the mode of their larval life in timber and the hard wire-like skin of these larvæ, as unsusceptible to wet as a duck's back, seeming favourable to their chances of successful transit); of Orthoptera, a *Gryllus* and a *Blatta*; Hemiptera, one; Homoptera, two; of Neuroptera, a *Chrysopa*; of Hymenoptera, two ants; of Lepidoptera, a *Diopæa* and a *Pterophorus*: of Diptera, two; and of these, without attaching much importance to it (as I admit that they are the product of chance introduction), I may still observe that, with the exception of *Blatta* (doubtless a naval *cadeau*), the whole, so far as named, are microtypal genera, a circumstance which ceases to be surprising if I am right in considering the non-coral isles of Polynesia as microtypal. I abandon the coral isles as "no man's land," but I claim as microtypal the islands which are composed of more solid stuff, especially those lying between Australia and America, and which are furthest from the influence of the New Guinea and Malayan subfaunas. It is from Tahiti and the Marquesas that the species of Coleoptera which we know from the eastern part of Polynesia have chiefly been obtained, from the New Hebrides and New Caledonia that we have received those from its western half. I shall take the eastern part first. Its microtypal character is thus well, although unconsciously, depicted by Fair-

* Darwin's 'Journal,' pp. 541–543.

maire in his "Monograph on the Coleoptera of Polynesia" (Rev. Zool. 1849–50):—"In general, the Coleoptera of Polynesia have a facies by no means equatorial: although living under a burning sky, in the midst of a luxuriant and always growing vegetation, their colours are sad, and their bodies do not exhibit the large size, the varied form, the metallic lustre which we admire in the Coleoptera of New Guinea and the East Indies. A Buprestid of tolerable size, *Chrysodema Tayauti*, almost alone represents that tribe so numerous in New Holland and New Guinea; the Chrysomelidæ are reduced to two or three insignificant species" (Rev. Zool. 1849, p. 279).

So much for the facies. The actual relationship of the materials composing it is shown in a Table in the Appendix, which I have made up from M. Fairmaire's work above cited, and in which I have marked the distribution of the different genera composing it.

From these it will be seen that not only a very large preponderance are of microtypal form, but that the fauna contains many genera which are familiar to the British entomologist as especially characteristic of the British subfauna, such as the genera *Anchomenus*, *Bembidium*, *Colymbetes*, *Agabus*, *Bolitochara*, *Placusa*, *Sunius*, *Leichenum*, *Anthicus*, *Ditoma*, *Cicones*, *Cerylon*, *Rhizophagus*, &c. The forms which have been borrowed from non-microtypal regions are not numerous; and there is no difficulty in indicating their source, the species being in many cases identical with that of the country from which it has come, a very common thing with introduced species, and which does not occur here with the microtypal species. In them the genus is the same, but the species is changed into new ones. It is this difference between recent immigrants and long-descended natives which generally renders lists of the distribution of mere *species* of so little value. They tell the tale of close vicinity, which we usually know without them, and of chance introductions, which throw no light on geographical phenomena; whereas lists of the distribution of *genera* speak of forms originally the same, but broken into new species by subsequent separation; and by their affinities we can trace their history much further into the past. In this concatenation the multiplication of genera on slight grounds is a serious obstacle to the study of geographical distribution. It injures it not merely by overburdening the memory with unnecessary names, but mainly by depriving

us of reliable data for estimating the affinity of the inhabitants of different regions which we should otherwise have had.

I give a list of the known species contributed from other countries in the Appendix, from which it will be seen that they are derived as follows, viz. from

North America	2 timber species (common).
Brazil	8 timber species (common).
East Indies and Philippine Islands	4 timber species (2 microtypal and 1 carabid).
New Holland	2 timber species, 2 Heteromera, both microtypal, and 1 Staphylinid, microtypal.
New Zealand	1 timber species and 1 Staphylinid, microtypal.

And 1 cosmopolitan wanderer of doubtful origin.

Besides these, however, there are a number of types from these countries which have probably been introduced by nature without the help of man; for they are modifications of peculiar forms, and not actually the same; and whatever may be the alterations which change of climate has made within the reach of man's observations on species of the higher animals introduced by him, there is not the slightest ground for supposing that any change has been ever so produced in insects. It was, of course, only to be expected that there should be something of this sort from the East Indies. It is natural that there should be some overflow or some dispersal into a country so near; and in conformity with this we find the proportion of its overflowings diminishing as we recede from India. It is for this reason that I have in my Table above mentioned limited the list to Fairmaire's species from Central and Eastern Polynesia. Even that is divisible into two sections. Of the Eastern, M. Fairmaire says:—

"At Tahiti, where the temperature is very various, owing to the lofty mountains, where numerous streams preserve freshness, the species are more varied, the individuals in greater abundance, *Carabici* and *Brachelytra* are met with. The Sandwich Islands, which are situated to the north of the Equator, at the same distance as Tahiti is to the south, give almost the same insects in very small quantity."—*Rev. Zool.* 1849, 279.

Of the middle portion, again, he says, "At Tongatabou, a flat

sandy soil, where water is rare at the surface, the *Carabici* and *Staphylinidæ* disappear, and in recompense the *Heteromera* appear in greater numbers, and some of the genera indicate, like the vegetation, an approach to Melanesia and Asia. It is the same as regards the Wallis Isles, the productions of which are almost identical with those of Tonga. In that western part we begin to find metallic colours, and generic types unknown to the eastern part, as *Amarygmus*, *Olisthæna*, *Mallodon*, &c.; but there remain still too many points of contact between these two zones to allow us to separate them distinctly."—*Loc. cit.*

The western islands have still more of this Indian element, as will be seen from the Table, which contains a list of the genera found by Father Montrouzier in New Caledonia. As my purpose is only to indicate the general character of the fauna of that part, I have not dissected it so minutely, but merely indicated the results. It will be seen from these that the microtypal stirps continues the staple, although a greater number of introductions from the Indian region and the Australian subfauna are visible. The most noteworthy of other alliances are those from South America; and perhaps the most interesting is the presence of a Firefly (*Photophorus*) in the islands (the New Hebrides) most distant from the South-American proper abode of the Firefly. The Glow-worm is a Miocene insect, and belongs to the microtypal stirps. The Firefly is neither. It is confined to the range of the Brazilian stirps. There ought to have been no Fireflies in my microtypal Pacific continent unless supplied from South America. There are other cases of a somewhat similar nature, in other branches, which will occur to the naturalist—for instance, the *Araucaria*, which, besides occurring in Brazil and Chili, is also found in the Pacific islands. This, indeed, is not so special a case; for Conifers being of old date in Europe, and in their associations and present distribution decidedly microtypal, the *Araucaria* in Chili and the Pacific islands may be modified descendants of the ancient European types, and the Brazilian species a straggler from them. The occurrence of the Tapir both in South America and the Malayan Archipelago points to a connexion between them at a comparatively recent date.

The other classes of insects, so far as I have gone into them, seem to me to corroborate the microtypal character of the Coleopterous fauna. As to the flora and avifauna I must, for the present, put them aside with those of Australia, with which they have considerable affinity and some identity.

New Holland is my next stage; and here I would first observe that the Coleopterous fauna of Australia, although recent discoveries show some modification and even a slight infusion of Malayan blood in the north, is as a whole homogeneous. In the next place, I do not anticipate any opposition to the general proposition that many of its ingredients, especially those in the south, have a European aspect. There are other elements which may very fairly form the subject of discussion whether they are derived from a microtypal origin or not; but as to the European affinity of a very considerable portion there can, I think, be no doubt. It will be sufficient to remind the entomologist of the genus *Pamborus*, the *Lebiidæ*, the *Broscidæ*, the *Feroniadæ*, *Haliplus*, the *Hydroporidæ*, the *Colymbetidæ*, *Gyrinus*, *Hydrophilus*, *Berosus*, *Arcticerus*, *Silpha*, *Nitidula*, *Soronia*, *Meligethes*, *Thalycra*, *Peltis*, *Hister*, *Morychus*, *Cucujus*, *Dendrophagus*, *Syncalypta*, *Ptinus*, *Trichius*, *Onthophagus*, *Aphodius*, *Lacon*, *Chalcophora*, *Lycus*, *Tenebrio*, *Anthicus* (of which there are 48 species already described from Australia), *Curculionidæ* allied to *Trachyphlæus*, *Lepyrus*, *Eurhinus*, *Otiorhynchus*, *Cryptorhynchus*, Longicorns (which, without being *Leptura* or *Rhagium*, are so like them that the names *Lepturoides* and *Rhagiomorpha* have been given them), *Haltica*, *Longitarsus*, *Hispa*, of the European type, *Coccinella*, &c., genera by far the greater number of which have no representative out of microtypal lands.

Even those forms which are usually considered typical of and peculiar to Australia, when carefully considered, lead to the same result. The *Anoplognathi*, one of the largest, showiest, and most brilliant metallic species in the country, belongs to a special group of Lamellicorns, which is well represented in Chili by allied forms (*Platycœlia*, *Brachysternus*, &c.); but it is still more closely copied in North America in what is there called the Goldsmith Beetle, *Cotalpa lanuginosa*; and if we pass on to Europe we do not, indeed, find it now, but we find fossil remains of it in the Miocene beds. The genus *Lamprima* is, at first sight, as peculiar as *Anoplognathus*, and equally restricted to Australia. It is little more than a metallic *Streptocerus*, a Chilian form, allied to *Scortizus*, which is not a very great deviation from the European and North-American *Platycerus*. I have a species (undescribed I believe) which has exactly the facies of an *Akis*, although systematists may insist on carrying it to *Adelium* or *Thoracophorus*. The Dish Beetle of the Australians (*Helæus*) looks as if nothing could come near it.

Examined, what is it but a modified *Cossyphus*? At the first glance, one would seek to place *Chrysolopus spectabilis* among the Diamond Beetles; at the second, among the *Aterpidæ*; but Lacordaire rightly tells us that both in character and habits it is only a magnified and abnormally decorated *Hylobius*. Another very characteristic Australian form is the genus *Paropsis*. But although almost confined to Australia, there are two exceptions, *Paropsis 12-pustulata*, Gebl., and *P. hieroglyphica*, Fab., both from Dauria, one of our microtypical countries, and one which, on any other other principle but that of my hypothesis, it seems difficult to connect with Australia. *Stigmodera* puzzles me as to its first origin more than any of the other peculiar institutions of Australia. It occurs in almost equal abundance and in still greater beauty in Chili, even showing itself by one or two stragglers in Brazil; and both its form and coloration are so close to those of our European and American *Ancylocheira*, which were already common in the Miocene epoch, that it is difficult to doubt that the one is a modification of the other; but then we have *Ancylocheira* proper also in Australia, the elongated form of *Ancylocheira*, which is found in California; and although that helps the microtypal list in one way, it rather militates against *Stigmodera* being descended directly from *Ancylocheira*. There is, indeed, nothing to hinder the species from having retained its type in part of the land and changed it another. On the other hand, however, *Stigmodera* can hardly be separated from *Temognatha*, certainly not in a derivative point of view; and *Temognatha* cannot be separated from *Julidimorpha*, and it is so like the African *Julodis* or *Sternocera* that it is difficult to believe that it does not contain some African black blood, communicated at the time when there was some connexion between the Cape of Good Hope and the south-west corner of Australia—a connexion which is recognized by all botanists, and whose traces are also discernible in all the other classes of organic beings, and which, as already said, may have been one of the means by which the Cape obtained the sprinkling of microtypal forms which is to be met with there. The Longicorn genus *Hesthesis* is now confined to Australia; but it is one of the European Miocene genera recorded by Heer. The genus *Chrysomela* is distinctly microtypal in its distribution, being, with a few easily understood exceptions, absent from India, Africa, and Brazil. One very distinct form of *Chrysomela* is the elongated

forms which are so common in Switzerland (*Oreina* and *Entomoscelis*). In Australia these are represented by *Australica*, which repeats their markings. The genus *Gallerucea* presents similar resemblances; I have a species from Port Phillip scarcely distinguishable from our British *Gallerucea Nymphææ*. Of *Hispa* I only know two in New Holland; but one of these is very closely allied to the black species of Europe (*H. atra*, Fab.).

But it is not only in what it possesses that Australia shows its microtypal origin, but also in what it wants. In it we have no large Dynastidæ or large Lucanidæ, no Brenthidæ (notwithstanding the close vicinity of the New-Guinea and Malayan Archipelago, where they are so abundant) except a few species in the extreme north of Australia, obviously derived from the Malayan islands, no Sternocera, no Steraspis, no Psilopteridæ. In these and a multitude of similar *lacunæ*, the Australian fauna corresponds with that of the microtypal stirps in other countries.

The relative predominance of types is another, though a slighter, indication of relationship. If, for example, we take the whole order of Longicorns, we shall find a remarkable parallelism in the number of species in Europe and Australia. Professor Lacordaire, in the 8th volume of his 'Genera des Coleoptères,' has the following remark upon them. "The equality," says he, "which exists in respect to numbers of species of Longicorns, between Australia, Europe, and North America, is remarkable. The first, according to Mr. Pascoe's Catalogue, published two or three years since, had then 407 described species. Europe, according to Schaum's Catalogue, had 412; and Melsheimer's 'Catalogue of North American Species,' as published by Leconte, had 408."

That a certain amount of infusion of New-Guinea and Malayan species should be found on the northern coasts of Australia was to be expected; but it is less, much less, than might have been anticipated, seeing that, from the shallowness of the Straits separating them, former union at some time or other might be predicated. I have already said that there is in some classes of animals and plants an affinity between the Cape of Good Hope and Australia. In the Coleoptera it is not very strong, but perfectly recognizable. For example, I think the characters, facies, and tuberculous covering of the Australian genera *Amycterus*, *Psalidura*, *Acantholophus*, and *Leptops* indicate affinity with the African *Somatodes* and *Hipporhinus*, of which latter, indeed, there are actually two species in Australia (as against seventy-six in

Africa); and the type seems to run on into Chili; for if *Leptops* is related to *Hipporhinus*, so is *Megalometis* (a Chilian genus) related, to *Leptops*.

A very remarkable African affinity in the Lepidoptera has been mentioned to me by Dr. Welwitsch. It is plain that an affinity to any genus endowed with peculiar properties is rendered doubly certain if the supposed allied species possesses the same properties. There is a Lepidopterous insect in Australia, the larva of which possesses remarkable poisonous powers. It has been named *Doratophora vulnerans*. Such insects also occur in South Africa. Livingstone speaks of a caterpillar called *Rigura* as producing fearful agony if a sore is touched with its entrails. Mr. Baynes, in his 'Explorations in South-west Africa,' speaks of another, or perhaps the same, which he calls the *Kaa*, and which is used as a poison for their arrows by the Bushmen; and Dr. Welwitsch had a personal experience of the severe swelling and pain in every part of his body which he touched with his hand after collecting specimens of a caterpillar against which he had been warned as poisonous. He had in consequence of the warning carefully avoided touching them, shoving them into a phial with a straw; but whether he had inadvertently touched them, or fingered the leaves on which they had been feeding (which he collected for examination), he and his servant were both laid up helpless for two or three days. His specimens of the caterpillar were lost; but among his Lepidoptera Dr. Fendler, of Vienna, who has undertaken a desciption of them, finds no less than four species of *Doratophora*; and these, doubtless, are the perfect insects of species of the caterpillar from one of which he suffered.

But although African affinities occur among the Lepidoptera, as among other classes, their character, as a body, is microtypal. I am not sufficiently a Lepidopterist to speak with any personal authority on the subject so far as regards minute distinctions; but I am sufficient of an entomologist to say that in the nocturnal Lepidoptera, especially those from Tasmania and South Australia, the facies is absolutely identical with those of this country, and many of the genera the same. Over the most of Australia diurnal Lepidoptera are extremely scarce; but the facies in them, too, is of the same character.

At the outset I admitted the wide difference between the present flora of Australia and our own microtypal flora; but I must not

make the admission too unqualified; I must not lose sight of the beeches, the Frenelas, the Phyllocladi, which are of a different stirps from that of the rest of the flora of New Holland, a microtypal class of plants, too, that obviously connect New Holland with the microtypal lands of Chili and New Zealand.

The mammals and the birds of New Holland must, like the flora, be kept apart, and put in another category from the insects. How far this separation has to be carried in other classes, I shall not examine at present.

The Coleopterous fauna of New Zealand, although it has a somewhat different facies from that of New Holland, cannot be really separated from it. There are too many points of concurrence which can be accounted for only by a common origin to allow us to do so. The facies, although not quite the same, is in the same line, sombre, sad-coloured, small, or moderate-sized species. One very marked and distinct family of Carabidæ (the Cnemacanthidæ of Lacordaire, Broscidæ of Putzeys) seems conclusive as to the former connexion of Australia, New Zealand, Chili, and Patagonia—that of Chili and Patagonia more distant, and that of New Holland and New Zealand more intimate, and both characterized by a distinct section, which Castelnau has erected into a genus, named *Mecodema*. Putzeys, who has lately published a monograph of the whole family, looking only at the countries in which it is located, says truly enough, "the Broscidæ are represented in most regions of the globe;" but it is only another instance of microtypal being mistaken for cosmopolitan. Taking the continents of our modern maps as real regions, the family is represented most widely; but disentangling the localities and referring them to stirps, not a single species will be met with in the Indo-Malayan, the African, or Brazilian fauna, but the localities will be found to lie all in microtypal regions, and to be pretty generally and equally distributed over them all.

It may be instructive if I run over the genera of which the family is composed. Taking Putzeys's Monograph we have—

Broscus. Europæo-Asiatic.
Craspedonotus. Japan.
Mecodema. New Zealand.
Metaglymma. New Zealand.
Percosoma. Tasmania and Victoria.

Lychnus. Tasmania.
Oregus. New Zealand.
Promecoderus. New Holland.
Anheterus. Adelaide.
Adolela. Swan River.
Parroa. Swan River.
Cascelius. South Chili.
Broscosoma. Europe.
Miscodera. Europe and North America.
Baripus. Montevideo, Port Famine, Chili.
Cnemalobus (*Cnemacanthus*). Chili and Patagonia, one species extending into Bolivia.
Gnathoxys. Australia.

The family is apterous, so that no theory of dispersal by powers of flight will apply.

The *Hydropori* and *Colymbetidæ* of New Zealand are exceedingly similar to our species—one species so much so, that it has been supposed to be introduced. *Staphylinus oculatus* is close to the Australian *Staphylinus erythrocephalus*, which is also found there; and it may be noted incidentally that there is a greater resemblance between the latter and *St. variegatus*, from MonteVideo, than to any Chilian species. This may be a key to some date or order of events; but one such key is not enough to unlock the close-bound history of these former epochs. One or two very European-like Longicorns occur; and even those which seem most puzzling, if studied in relation to our own species, will, I think, be found to belong to the same type; for instance, *Hexatrichia pulverulenta*, Westw., is only an enlarged *Pogonocherus*, as is *Oopsis nutator*, from Polynesia; and *Pogonocherus* is surely microtypal. That some of the Longicorns have a relationship to those of New Guinea and the Indian Archipelago (*Tmesisternus*) is only what we might expect. I have had my attention drawn to a species which is described in the zoology of the 'Novara' voyage as inconsistent with my hypothesis—a species of *Acanthoderus*, a genus the metropolis of which is now Brazil. But, curiously enough, notwithstanding this, the genus *Acanthoderus* occurs in the Miocene beds of Europe, and three species still survive in the northern regions, two in Europe and one in North America. How the genus comes to be so strongly represented in the Brazilian fauna is another question. It may be a type of universal

distribution, or it may be there as a representative of the microtypal element.

I now pass on to the Indo-African stirps. I may take it for granted that the East Indies south of the Himalayas, Siam, the south of China, and the Malayan Archipelago, all belong to one fauna or subfauna. It is not even possible to make subsections of any portion of them; not only the genera but even the species are often the same on both sides of the Bay of Bengal.

The only point on which I anticipate any difference of opinion in this direction is the relation of the New-Guinea group of islands to the Malayan group. As every one knows, Mr. Wallace has in various publications advocated a separation of the New-Guinea group from the Malayan by a line drawn up the Straits of Macassar, and has given a variety of interesting details in support of his views. Convinced by his reasoning, I adopted and followed his conclusions in my book on the 'Geographical Distribution of Mammals.' That was all right. The facts, so far as regards the Mammals, entirely supported Mr. Wallace's views, and I could do nothing else but adopt his hypothesis. I went rather further, however; I accepted his theory as of general application; and whether I have actually committed myself to that in so many words or not, I know I meant that, and I have no doubt that impression is given by what I say. I wish I had been a little more reticent; I now find, on a careful application of his hypothesis to Coleoptera, that it will not answer for them. Whether it be that we are dealing with creatures representing a more ancient state of things (the birds and mammals speaking to an arrangement of land and water at a comparatively recent period), or that we have overestimated the value of the differences of the fauna on each side of the Straits of Macassar, I do not know; but I do say, with a degree of positiveness and decision which, at any rate, must secure confidence in the strength of my own conviction, that the Coleoptera of the New-Guinea Islands are essentially Indo-Malayan. When I wrote my monograph of Nitidulidæ, I studied, as was my duty, the species collected by Mr. Wallace most thoroughly, and there was not a vestige of any element but the Indian element among them. So with the great mass of the rest. My friend Mr. Pascoe, who is our first authority on Longicorns, shares my opinion as regards them. There are undoubtedly a number of peculiar forms among the New-Guinea Coleoptera; but a few unusual

forms in the face of thousands of allied forms would be a poor foundation on which to rest a distinct fauna. As a subfauna distinguished by the numbers of Anthribidæ, new forms of Brenthidæ, beautiful Tesosterni, &c., it may pass; but even then the line cannot be drawn, as in mammals and birds, with any sharpness. Australia, as it has been affected slightly by the vicinity of this Indian fauna, also has contributed a little of its own specialities to the nearest islands.

Mr. Frederick Smith's Table of the geographical distribution of the species of Hymenoptera collected in this archipelago by Mr. Wallace shows the same thing (Linn. Soc. Proc. vii. p. 109, 1864); and a still more striking result to the same effect would be exhibited if the genera were contrasted in the same way as he has dealt with the species.

The Philippine islands belong to the same group, although, like Formosa (which is on the boundary), they are probably not without a microtypal tinge. The *Pachyrhynchi* may fairly be considered to be representatives of the strictly microtypal genus *Otiorhynchus*.

Africa (south of the Sahara, of course) is better entitled to claim rank as a separate province than India. The general facies is different, the character and tone of the scenery is more decided—no doubt, owing to the difference in the conditions of each country, which has given greater predominence to one part of the same fauna in the one, and to another part in another. In Africa the great sandy deserts have encouraged the development of *Adesmia* and such desert-loving Heteromera, while in India there has been not only apparently a greater admixture of foreign elements, but in much of it, especially in the moist forest-overgrown island-mountains, there is no scope or suitable conditions for such species, but the other members of the fauna which flourish in wooded lands take their place.

One strong argument in favour of the original unity of the stock of India and Africa is that most of the genera which occur in the one country are to be found in the other when suitable conditions present themselves. It must always be kept in mind that while the presence of uncongenial conditions is a perfectly good explanation of the absence of any forms we might expect to meet, we have no right to expect something else to be there unless that something is a member, an ally, or a modification of something already in the fauna. Thus the absence of sandy deserts will account

for the absence of *Adesmias*, but will not account for the presence of Brenthidæ, unless the Brenthid element were previously in the fauna; and so where, in a different country having special conditions, wholly new things are met with, the inference is that we have come into a new geographical region. Applying this to India and Africa, we can trace the concurrent existence somewhere or other of so many of the same genera in each, although certain elements preponderate in the one more than in the other, that it seems to me impossible to doubt that their origin is the same—that is to say, that before they were separated from each other the general type from which they have sprung was the same in both.

In my book 'On the Geographical Distribution of Mammals' I contrasted the genera which were present in Africa with those which were present in India; and the one list was almost a copy of the other. I did the same with the genera which were not found in Africa and those which were absent from India; and here again the lists were almost identical. Similar lists of the genera of Coleoptera present in, or absent from, the two countries give similar results. There is not space to make such an enumeration here; but I may remind the Entomologist of such characteristic genera common to both, and confined to both, as *Anthia*, *Ateuchus*, *Heliocopris*, *Goliathus*, *Heterorhina*, *Glycyphana*, *Popilia*, *Platynotus*, *Notocorax*, *Ceroplesis*, *Sagra*, &c. In many instances, too, where the genus is not confined to India and Africa, I think we may discern something in common between those species which come from these two regions. Thus in *Cicindela*, for example, a very common bond of union is the possession of white sutural lines or patches. In *Chlænius* the species with a narrow constricted thorax are mainly confined to these regions. The Platycorynus form of *Eumolpus* occurs in them, and in them only; so does the flat palmate expanded form of *Hispa*; and many more will occur to any one who searches for them.

The forms which are absent are scarcely less instructive than those which are present. There are, no doubt, many present in the one and absent from the other, whose presence or absence must be referred to dying out or first appearance after the separation of the two lands: but there are others which have a different significance. For instance, all the Staphylinidæ are very scarce in Africa. Through the kindness of my missionary friends I have received thousands upon thousands of Coleoptera from Old Cala-

bar. For several years, while Mr. W. C. Thomson and the late Mr. Wylie were stationed there, I was in the habit of receiving large collections every year from that place; and yet during all that time and out of all that multitude I never saw a Staphylinidous insect among them. In other parts of the continent, where, as at the Cape, they have been exposed to microtypal contact they do occur, but in trifling numbers. Boheman mentions thirty-eight in his 'Insecta Caffrariæ." Natal and Mozambique supply a very few more; and Dr. Welwitsch found a few of the same genera in Angola. Now India is as poorly supplied with them as Africa; and the chief part of those found in both belong to such genera as *Pæderus*, *Osorius*, &c., which may possibly not be microtypal. But there are true microtypal species, both of Staphylinidæ and other groups, which are not found in India and yet occur in Africa, and which, I think, must therefore have been introduced subsequently to the separation of India and Africa, as, for example, *Aleochara*, *Cymindis*, *Anchomenus*, *Feronia*, *Bembidium* (see Boheman's 'Insecta Caffrariæ'), and various others, some of which will be found in the Table of the present distribution of Miocene genera given in the Appendix. There are three ways in which these may have made their entrance into Africa—(1) by Nubia and Abyssinia, (2) by the connexion with South-west Australia to which I have alluded, or (3) by the union with Patagonia, which I think can scarcely be disputed. One or two noteworthy peculiarities attend all these elements of mixture; viz. the comparatively small numbers of species which have succeeded in establishing themselves in the country or which have become generally distributed; the small progress which has been made by them in penetrating into it and getting away from their starting-point; and the absence of amalgamation with the original fauna on which they have been superinduced (which last is a strong argument against hybridization having any important part in the creation of new species). To these we must add, as obviously belonging to the same category, the remarkable disinclination or difficulty which one established fauna shows or finds to passing beyond its own limits into the territory of a neighbouring fauna, although the barrier which formerly separated them (and was the cause of them each having a distinct character) is now no more than an imaginary line. In Africa we can perfectly put our hands on the Abyssinian interlopers dropping in from the north-east, some, like plants and insects on Alpine mountains elsewhere,

having got into positions where their retreat has been cut off by a change in the physical conditions of the country *. In like manner we can point out the Australian intruders at the Cape, the Cape element in Patagonia and without difficulty detect certain Brazilian settlers, which I shall presently mention as having made their way into West Africa. This, at first sight, seems difficult of apprehension and inconsistent with the wide spread of the very same species in other countries. Here are a few Staphylinidæ lingering at the Cape or at Angola without having succeeded in penetrating into West Africa, although, so far as we can judge, they have been there for many geological epochs; while other or the same genera of Staphylinidæ have in the short period since the retreat of the glacial epoch covered the north of Europe, Asia, and America with their hordes. There is something more here than mere physical barriers standing in the way of their dispersal. The explanation is simple: when the land fitted for their occupation is left free and unoccupied, as the northern half of Europe, Asia, and America was after the glacial epoch, the new comers cover the ground like wildfire, and the fauna and flora is rapidly established. When the ground is once occupied the case is different; every new comer meets the most stubborn resistance, the battle for life is resolutely contested, and the small proportion that we find established shows that few make good their entrance at all, and still fewer make any progress in their new land: and the truth may be that, instead of looking upon a scanty infiltration of an alien element into a land as an indication of its having been very ancient and almost washed away by repeated dilution (as we have generally been disposed to do), we should regard it only as an indication of a more recent attack on a well-garrisoned land which has successfully repelled the intruders. This is a consideration which throws additional light upon the enormous power and importance of the counterpoises of nature,—without them a land instantly taken up, with them the established order of things inpenetrable to all assaults—not an encouraging reflection to revolutionists, if the same rule prevails in the moral world which exists in the material world, which we cannot doubt to be the case. The students of geographical distribution may likewise

* The Berlin Museum has obtained from Mr. Van der Decken's expedition, a true Carabus from Mount Kilimandjaro. It is the only Carabus that has yet been found in Africa proper, is peculiar in form (elytra swollen and rounded), but in other respects more in the direction of *C. alpinus* of Switzerland than any thing else. It is obviously a European form whose retreat has been cut off.

draw useful reflections from it, both general and particular. An important general reflection is that, whenever we see a homogeneous fauna (I am speaking of faunas, but the observation applies equally, or nearly so, to floras), we may rest assured that that is the first fauna which established itself after the land emerged from the sea and became capable of sustaining animal life, and that we must look upon all patches, encroachments, or overlayings of a different character, as attempts of some subsequent intruders to establish themselves among the older inhabitants. We see, too, how there is no inconsistency in a colony marching rapidly across a raised sea-bottom, while it is arrested the moment it reaches the other side. Coming to particulars, this may prove useful in sometimes helping us to a date. Thus we may argue from the faunas of India and Africa that these countries were once continuous and united, and that they were disjoined before the Cape received its contribution from Australia; for there are types common to Africa and Australia which do not occur in India.

The relation between the Coleoptera of Brazil and West Africa furnishes so very apt an illustration of the value of such indications, and the use that may be made of them in tracing the past history of geographical changes, that I may be excused anticipating a little what I have to say on the subject of these faunas.

A few years ago I read a paper to this Society, in which I pointed out the existence of the Brazilian element in Old Calabar. I believe that paper was closely scrutinized at the time (in fact, I know it was) by some of our best entomologists, who looked askance at it at first, but ended by admitting that I was right. Since then I have gone on, from time to time, describing the new species from Old Calabar in the 'Annals of Natural History;' and I do not believe there has been one of my papers in which I have not had to record the Brazilian element as again and again appearing. The same thing is observed at Senegal and Guinea, and Gaboon; and it has also now been recognized in the Lepidoptera also.

The evidence thus given of the presence of an important infusion of Brazilian type in the West-African fauna seemed to me sufficient to place the fact beyond dispute; and I would not now have troubled the reader with any further proof of it, had it not been for an expression of opinion which has fallen from our much-respected President between the reading of this paper and the

printing of it, which shows me that I must not take this for granted; and the delay in printing this paper fortunately gives me the opportunity of supplying the want. Mr. Bentham, in his Annual Address, 24 May 1869, p. xciv, says:—

"Mr. Andrew Murray, in a paper on the Geographical Distribution of the Coleoptera of Old Calabar, in the twenty-third volume of our Transactions, as well as in his Monograph of Nitidulariæ, in the twenty-fourth volume, calls attention to a remarkable representation of Tropical-American types in Tropical Africa. I have myself on several occasions indicated a similar curious connexion in various vegetable types; and if we were to rely on these grounds alone, we might, with Mr. Murray, speculate on a former continuity between the two continents across the Atlantic. But, independently of geological arguments, such conclusions are much invalidated by facts since brought to notice, as, for instance, that some of these common types are also represented in Australia or other distant lands south of the Equator. The general features also of the vegetation of the two continents tend to the conclusion, more or less confirmed, I believe, in various zoological departments, that, from a very early period in the history of organic life, the broad Atlantic, from the southern tropic to far into the north temperate region, has been an impassable gulf for terrestrial organisms, except by such occasional waifs and strays as may result from actual means of dispersion."

Although neither by nature nor training at all disposed *jurare in verba magistri*, I candidly acknowledge that such an expression of opinion coming from one to whose judgment I, in common with all other naturalists, pay so much deference, satisfies me, not that I am wrong, but that my proofs are insufficient. I bow to his decision, lay fresh proofs before him and the reader, and ask a fresh judgment. In the Appendix I give a list of the genera of Coleoptera of Old Calabar with Brazilian affinities, so far as I have yet published them. I am not yet half through; but what is published may be taken as a type of what is to follow. I might have swelled my list by including *species* of universally distributed genera which were allied to Brazilian species of the same genera; but I have omitted them and taken only genera peculiar to the Brazilian stirps. The genera in this list amount to 21 out of 188, or about a sixth of the whole. Next, to make sure that I do not expose myself to the objection that "some of these common types are also represented in Australia or other

distant lands south of the equator," I have endeavoured to make sure that none which I cite can come under that category; so that my argument cannot be touched by it. At the same time, I may say that I do not know to what species Mr. Bentham refers as falling under that category. I know of none. Lastly, as regards the opinion with which he closes, that "from a very early period in the history of organic life the broad Atlantic from the southern tropic to far into the north temperate region has been an impassable gulf for terrestrial organisms," I have only to say, "So be it, I do not dispute it." Carry back the date to as early period as you will; all I say is that at some period, and *that* a period subsequent to the appearance of the present forms of Coleoptera, the broad Atlantic was traversed, in at least two directions, and probably at three different times, by a stretch of dry land which united West Africa with Brazil, which united Patagonia with the Cape, and which, last of all and probably not without relation to the preceding, united Brazil with Madagascar.

At the outset I endeavoured to show the long-continued persistence of the present forms of Coleoptera; I pointed out that in the Miocene times they almost all come within our existing genera, that the same facies already existed in the Coal-epoch; and I do not suppose that Mr. Bentham or any one else will exact a higher antiquity for the Atlantic than that time; or if they do, there seems no reason why, since the forms of our Coleoptera have endured for so long a period, they should not stretch as much further back as any friend of the Atlantic may choose to carry its age.

On the strength, then, of the presence of the Brazilian types which I have shown to exist in West Africa, I think I am entitled to infer the former union of Brazil and that country. Now West Africa is almost entirely destitute of microtypal forms: there are a few; but their proportion is so trifling that it sufficiently indicates that they form no part of the original stirps, and are to be regarded as intruders who have made their way in from abroad. But if West Africa has little microtypal intrusion, no distinct fauna has more than Brazil; and it might reasonably be anticipated that, if the two countries had been united, a portion of the microtypal stirps would have filtered into West Africa through Brazil; but we do not find it to be so. Not only are there few microtypal genera in West Africa, but those which exist are not species whose origin we should think of referring to Brazil:

generally speaking, it is not difficult to suggest their source. This absence of microtypal Brazilian forms is shown in a remarkable manner by the Staphylinidæ, an immense family which, as I have already shown, is (with the exception of one small branch of it which has found its way into India and East Africa) now entirely confined to and very characteristic of microtypal lands. I have explained that that family is entirely absent in Old Calabar; and I believe it is equally so throughout West Africa. In the Brazilian district, on the contrary, it is widespread, and in some places abundant, especially Columbia and the districts adjoining the Andes. It would seem to follow from this, that the union between West Africa and Brazil must have existed and been brought to a close before Brazil itself received its microtypal element, at all events before it possessed Staphylinidæ, which seem to have been a late acquisition. There was thus a time when the Brazilian Coleopterous fauna was of pure unmixed type of the same character as that which it has communicated to West Africa; in other words, I have been right in classing the Brazilian as a great distinct stirps. That period must have been prior to its union with the rest of South America; for all round it is microtypal; and it must have been prior to its existence as an island, which, on other grounds, we know to have been a phase through which it passed. I have, in my 'Geographical Distribution of Mammals,' given a map which shows the form through which it probably passed when it and Venezuela and Guyana were islands—a separation which created subfaunas which still subsist, well marked and well defined, although the general type is unmistakably the same.

The way in which I read its history by these lights is:—first, that a great continent extended across what is now the Atlantic, from Brazil to West Africa, shut off by an ocean from the Andes or nearest land to the west (wherever that may have been), on the one hand, and from Eastern and Southern Africa, on the other; that this continent next sank in the middle and the Atlantic took its place; that, according to the laws of gravity and equilibrium, as its centre sank, its two ends and their shores rose, uniting West Africa to the rest of its continent, and Brazil to the Andes or western microtypal land. And as the sea-bed to the west became bare and dry, the Staphylinidæ and other microtypal forms rushed in from the west and the Brazilian types from the east; and, the ground being free, both established themselves together, under the

law to which I have already referred as regulating the introduction of new species to new countries, viz. that if it be full, they make little way—if empty, rapid progress.

I make these flying shots at a covey of dates; not that I imagine that difficult problems like these are to be unloosed by crude generalizations from the few uncertain facts of doubtful import which we possess, but as illustrations of the kind of use to which some of the principles which I see only dimly looming through the haze, but which I do believe to have truth and substance in them, may be put when we have got more facts and know better how to use them. One fact seems to shine clear out of the mist; and that is that in all those countries where different types have made good their footing, the races seem to preserve their identity for all time, mixed but never blending, approximated but never amalgamated. If hybridism be an agent at all in the production of new species, it certainly carefully confines itself to its own type.

The islands in the Indian Ocean between India and Africa (Mauritius, Réunion, &c.), exclusive of Madagascar and its immediate dependencies, are partly Indian, partly African and Malagasse. Madagascar is a land of wonders, not only for what it contains, but for its relations with other countries. The basis of its fauna is African; but it has also elements of its own, some of which may be traced far off, and in countries which have lent it something in return. We do not yet know how these peculiarities are distributed in the island. One collector goes to Madagascar, and he finds little or nothing but common African forms. Another goes to some other part of the island (some of them, especially the older ones, have not been so particular as we now find it necessary to be in reporting the localities searched and their products), and he sends home the most wonderfully attractive and strange forms it is possible to conceive. A double fauna is certainly represented there—one African and the other American—some have said allied to North America, others to Mexico, and others to Brazil. It is a slight tincture of the Brazilian stirps which is found in all three. The African connexion will, I dare say, be admitted. The Brazilian is proved by the presence in Madagascar of various representatives of Brazilian forms. Thus *Polybothris* represents the Brazilian *Psiloptera*; *Doryscelis* represents *Gymnetis*; *Stigmotrachelus*, *Platyomus*; *Peltis Ivanii* is found in both; but by far the most convincing instance is a moth of the genus *Urania* (to my mind, the most gorgeous Lepi-

dopterous insect in existence). It is an unusual thing at any time to meet with a gay-coloured moth; but one with metallic brilliancy is still rarer: *Urania* exceeds any thing I know in this respect; and it stands *per se*, nothing else like it in any other genus. Of this genus there are six species—one in Madagascar (*Urania Ripheus*), and the other five within the range of the Brazilian fauna, viz. two in Brazil (on the Amazons), another in Venezuela, one in Cuba, and one in Jamaica. *Stelidota octomaculata* is an example of affinity with North America. The mammal *Solenodon* of the West Indies has been claimed as allied to the Madagascar *Centetes* (this, I think, on insufficient grounds); but Madagascar is the only place where (with one exception) Iguanoid lizards occur out of America, and the only place in the Old World which furnishes examples of the American Colubrine forms *Xiphosoma* and *Heterodo*. The Lemurs, too, as I have elsewhere argued, are perhaps more nearly related to the Opossums or Squirrels than to the Monkeys; and if it be to the Opossums, that would be a link the more with Brazil. It is to be observed that all these affinities are confined to Madagascar and do not touch South Africa. According to my views, they are insoluble except by the supposition of a dry-land communication between Madagascar and South America. My conjecture is that when the communication between Patagonia (the penultimate) and the Cape was interrupted by the sinking of the land, all the land did not sink. The ground now occupied by Patagonia did sink; the land next Africa also sunk, but a mountain-range survived running from Cape Frio (Rio Janeiro) obliquely across the Atlantic to a point a little to the south of the Cape of Good Hope, there rounding the Cape and running up to Madagascar exactly in the shortest line that a ship could sail directly from Rio Janeiro to Madagascar. It may seem too child-like and direct to the purpose to propose such a route; I felt it so until I studied the sea-bottom, when I found that there a broad raised ridge does run along the bottom of the sea exactly in the direction I have laid it down. I was not aware of this until I saw it so mapped in a map of the bed of the Atlantic in Mr. Keith's Johnston's New Physical Atlas. No one will dispute the importance of the configuration of the bottom of the sea as an indication of the line of ancient continents; and on the strength of this and of the fauna of Madagascar, I think I have very fair grounds on which to base my hypothesis. Being a ridge, it would continue so when above water, and not

appear as a plain like the desert Patagonian junction, but a mountainous or hilly country which would be watered by streams, clothed with forests and fitted for the habitation of such sparkling creatures as the *Urania*; for we see that nature always assimilates the aspect of the inhabitants of a country more or less to its prevailing hue; and where forests and flowers and dewdrops abound, there she clothes them in her most gorgeous robes.

It may be that the last scene of all of this strange eventful history, prior to the appearance of the land as it now stands, was the extension of the microtypal regions of Cape Horn out to Kerguelenland, whereby the antarctic islands had already received their present flora, an extension which must have subsisted until a comparatively recent period, at least subsequent to the glacial epoch; otherwise I do not see how these islands could have been redintegrated in the possession of their flora after the retreat of the ice. As regards the bridge or range to Madagascar, that must have been its last scene; for otherwise we should not have it preserving its position and contour at the bottom of the sea.

Africa itself is not difficult to read. Subject to the modifications of which I have been speaking, the whole of the eastern half of the continent is one broad band composed of one fauna.

Lay a parallel ruler on the map, with one limb along the east coast and the other limb drawn back as far west as Congo on the west coast, and you have the region I refer to pretty fairly marked out. It includes Abyssinia, Somali-land, Mozambique, Natal, the Cape, Namaqua-land, and Angola. A succession of great lakes and deserts is known to mark out part of the western margin of this region; to the west of it, or rather of the barrier so composed, we have what I may call an island surrounded by a nearly dry ditch, viz. the unknown region between Gaboon and the Congo on the south, a moat only partially supplied with water, the Albert-Nyanza line of lakes on the east, the Sahara on the north, and the Atlantic on the west. The countries of which this island is composed are, Senegal, Guinea, Old Calabar, and Gaboon. While it has a large share of the general African element of the eastern side of the continent, it has also specialities of its own, and superinduced upon it the very perceptible flavour of Brazil of which I have already spoken.

In fixing the southern limits of this South-American element in West Africa, I have been guided partly by the descriptions

of the Coleoptera of Angola, published by Erichson in Wiegmann's 'Archiv,' in 1848, as corrected by Wollaston's removal of the Cape-Verd species, which the death of the collector, Grossbentner, had occasioned to be confounded with the general Angolan collection, and partly by the collections made by Dr. Welwitsch. The Fellows of the Linnean Society know Dr. Welwitsch chiefly as a botanist, or, perhaps, through his and M. Morelet's recent work 'On the Mollusca of Angola,' as a conchologist. But his entomological collections are not less admirable in every respect than his botanical; and through his liberality and kindness I have had the advantage of studying in them an amount of material greatly exceeding in extent the collection described by Erichson. From it I am enabled to say that the Brazilian element does not come south into Angola. The type of the Angolan Coleopterous fauna is Caffrarian beyond any question.

The Brazilian stirps should alone now remain to be treated of; but in speaking of other regions I have already said by anticipation every thing that I have to state regarding it.

There is one point, however, on which I have a general remark to make, which is also specially applicable to it. In Columbia and some of the border-lands nearest the microtypal stream in the Andes we see many fine, rich, glowing metallic species, which, from their size and beauty, we are naturally led to refer to the Brazilian stirps, but which in reality belong to genera which, without doubt, are naturally microtypal, as *Harpalus*, *Philonthus*, *Xantholinus*, *Staphylinus*, &c. When we have to determine to which stirps such species belong, we must discriminate between the natural brilliant elements of the Brazilian fauna and the superadded brilliancy developed upon microtypal forms by the special conditions of the locality. Columbia and Ecuador abut on the eastern margin of the microtypal range in Equatorial America, and a modification of the stirps is to be expected there. Mexico, Central America, the West Indies, New Granada, Columbia and Ecuador, Cayenne, and in some cases even Venezuela are to be regarded as debatable lands, in which the true character of the stirps to which the species inhabiting them belong is to be determined, not by the place in which they are found, but by a sound consideration of their affinities and distribution elsewhere.

Appendix.

Table I.—Showing the actual present distribution of the following existing genera recorded to have been found in the Miocene beds of Oeningen, Radoboj, Rott, Aix in Provence, and Iceland.

Explanation.—A single asterisk means that the genus occurs in the countries indicated by it.

A double asterisk that it occurs in force.

Where numbers are given, they indicate approximately the number of species known to occur in the country in question (note 1).

1. *Coleoptera.*

1. *Coleoptera* (continued).

1. *Coleoptera* (continued).

1. *Coleoptera* (continued).

Notes to 1. *Coleoptera.*

Note 1.—This Table is made up to show the distribution of particular forms. On this point, the relative number of species is a secondary consideration; and even were it not so, we could not use it; for the statistics we have are, for any purpose requiring accuracy, wholly unreliable, from insufficient exploration and imperfect knowledge of the contents of different countries, from unnatural dismemberment of forms into new genera, and from the inaccuracy or carelessness of describers, who, besides describing, as new, species which have been already described, have multiplied or diminished the number of species, each according to his own notions of what constitutes a species. To say nothing of the number, however, might sometimes lead to an undue idea of the strength of representation of the same genera in different countries; I have therefore occasionally added the approximate numbers of the species known in each district, when it could be done without much trouble and with some approach to accuracy. Where I have not given the numbers I have marked the dis-

tricts where the genus is strong by a double asterisk, where weak by only one. My numbers, where given, have no pretence to more than a general approximation: for my purpose this is enough; and I believe they will be found sufficiently near to answer it.

Note 2.—The geographical regions in this Table are:—

1. Europe, including the Mediterranean district, North Africa as far south as the southern margin of the Sahara, Syria, Asia Minor, and the shores of the Black Sea.

2. Asia, north of the Himalayan range, from the Ural mountains and Caucasus eastward to the Pacific.

3. North America east of the Rocky mountains.

4. North-west America from Behring's Straits to Mexico.

5. The Chilian region, including the whole of South America to the west of the Andes, the part of Peru in the Andes, part of the South of Bolivia, and the western and southern part of Paraguay, also La Plata, Patagonia, and Terra del Fuego.

6. Australia, including Van Diemen's Land. I should have wished to divide Australia into the northern and the southern halves; but as yet our materials are insufficient to allow this to be done. More attention is now bestowed on localities; and I trust it will not be long before we can fairly allot the different portions of the Australian fauna.

7. New Zealand.

8. Polynesia. In this I include the islands between Australia and Chili, except New Zealand.

9. Debatable land between North and South America, including Florida, New Mexico, Mexico, Central America, and part of Columbia, New Granada, and Cayenne. I have added this and the two following columns of debatable land for the purpose of as much as possible keeping the elements of the faunas on either side of it free from what may have been a foreign influence. The reader can carry it to the credit of either as seems to him agreeable, or omit it altogether.

10. Debatable land between the East Indies and Asia, including the Himalayas, Nepal, Silhet, the Burmese mountains, part of China, &c.

11. Debatable land between North Africa and the northern frontier of Senegal.

12. Brazilian region, the parts of South America lying east of the Andes and not above disposed of.

13. The Indian region, including the East Indies, the Malayan Peninsula, the Indian Archipelago, Siam, Cochin China, the south of China, the Philippine Islands, and New Guinea. In any list for more general purposes, New Guinea and the Philippine Islands should be kept separate; but, looking at the genera I have to deal with, this is not necessary here.

14. The West-African region, consisting of the country from Senegal to Gaboon inclusive, and eastward until it meets the East African region, wherever that may be (probably in the line of the lakes).

15. South Africa, containing Angola, Caffraria, Natal, Mozambique, and northward to Somali-land. The south of Arabia also, I believe, properly belongs to this province; but it does not happen to come into question here.

16. Madagascar. I do not include in it the neighbouring islands of Bourbon, Mauritius, Rodriguez, &c., although they do belong partly to it and partly to India; but the points in which they correspond with it are those in which Madagascar also coincides with Africa; and my object in keeping Madagascar separate is not to show its relation to Africa or India, but its more unexpected relations with South America. When I have to deal with species from the smaller islands (Bourbon, &c.), I carry them to the credit of India or Africa, according to which the affinities of the species indicate.

Note 3.—*Anchomenus*. Some of these supposed Brazilian *Anchomeni* are, doubtless, as suggested by Lacordaire, *Dyscoli*; and of others the habitat is possibly erroneous. Several of the citations are of old date, when every thing from South America was ticketed Brazil; still there are undoubted species from Brazil.

Note 4.—*Tachyporus*. (Out of more than 250) only one occurs in Nepaul, doubtless a straggler, one in Bengal (which may have been derived from an Himalayan straggler), one in Java, and one in New Guinea.

Note 5.—*Byrrhus*. I include in this the allied genera, *Curimus*, *Cytilus*, *Morychus*, and *Amphicyrtus*.

Note 6.—*Onitis*. Tolerably numerous in Europe and Asia, but only one in North America, one in India, and one in Australia.

Note 7.—*Aphodius*. Only one recorded from Brazil, out of an

immense number which, with that exception, are found in the microtypal and Indo-African regions.

Note 8.—*Anoplognathus*. I have included under this head *Cotalpa* (North American) and *Brachysternus* &c. (Chilian).

Note 9.—*Pentodon*. Although not present as a genus in America, it may be present under some one or other of the American types of the Pentodontidæ, as *Podalgus*, *Heteronychus*, *Bothynus*, &c.

Note 10.—*Ancylocheira*. In this I include *Bulis* and *Asthræus*.

Note 11.—*Ampedus*. In this I include *Elater* and *Grammophorus*.

Note 12.—*Ischnodes*. By *Ischnodes* I suppose Heer to mean the second section of Candèze's *Anchastus*. The first section consists of three Brazilian species, which I omit. The second is distributed as in the Table, and, besides, contains one St. Helena species, *Anchastus atlanticus*.

Note 13.—*Cardiophorus*. Only one in Australia out of about 150 species.

Note 14.—*Telephorus*. I include *Podabrus* under *Telephorus*, not only on account of the indistinctness of the fossil specimens, but from the closeness of their natural relationship.

Note 15.—*Clerus*. I am not sure in what sense Heer intends *Clerus* to be used; and his figure scarcely helps us. I have taken it in the narrower sense in which it is now used.

Note 16.—*Gonocephalum*. In this I include *Opatrum*.

Note 17.—*Boletophagus*, including *Ulodes* and *Eledona*. I can find only one species recorded from India, without special authority. If from the Himalayas, it doubtless is a straggler from the north.

Note 18.—*Uloma*. The common species is introduced with cereals into all lands—which, as Lacordaire says, leaves its real native country in uncertainty; but, from its occurring in the Miocene fauna of Europe, it probably ought to be referred to Europe.

Note 19.—*Apion*. The debatable-land species are chiefly from Columbia, which is half microtypal.

Note 20.—*Brachycerus*. In this I include all the Brachyceridæ. It may be a question whether this form was originally African, and from Africa passed into South Europe previously to the Miocene times, or, being European, it subsequently found its way into Africa, which is now its head quarters.

Note 21.—*Hipporhinus*. Similar remarks apply to this.

Note 22.—*Acalles*. Largely represented both in itself and by allied genera in the Atlantic Islands.

Note 23.—*Cossonus*. Ditto.

Note 24.—*Lamia*. The genus *Lamia* is too large to know what type of it Heer referred his fossil to. I am in doubt and have had to leave this blank.

Note 25.—*Dorcadion*. I include the Mexican form *Monilema* as part of *Dorcadion* in this inquiry, not as otherwise a bad genus.

Note 26.—*Donacia*. Lacordaire, in speaking of the Indian and African species of *Donacia*, cites, as an interesting fact in regard to their distribution, that they have more analogy with the species of North America than with those of Europe. I cannot, however, see it.

Note 27.—*Coccinella*. The special genus or subgenus of a fossil *Coccinella* can scarcely be distinguished. I have therefore included several allied genera besides *Coccinella*, which makes it cosmopolitan. Strictly confined to the modern subgenus, it has been met with everywhere but in Polynesia and Madagascar. The vast numbers in which it has often been met with, and the appearance of flights of them migrating to other quarters, have probably something to do with its wide distribution.

2. *Orthoptera*.

Genera.	Europe and Asia.	North America.	Australia.	Chili &c.	India.	Africa.	Brasilian region.
Phaneroptera	*	*	...	...	*	...	*
Gryllacris	...	...	...	...	*	...	*
Œdipoda	*	*	*	...	*	*	
Gomphocerus (*note* 1) ...	*	*	...	...	*	...	*
Mantis	*	*	*	*	*	*	*
Blatta.........................	*	*	*	*	*	*	*

Note 1.—*Gomphocerus*. This genus is divided into two sections, of which the first is confined to Europe.

3. *Neuroptera.*

Genera.	Europe and Asia.	North America.	Australia.	Chili and Polynesia.	India.	Africa.	Brazilian region.
Termes (*note* 1)............	*	*	*	* New Zeal.	*	*	*
Agrion	*	*	*	* Polynesia.	*	*	*
Æschna	*	*	*	* Polynesia.	*	*	*
Cordulia....................	*	*	*	* New Zeal.	*	S.Afr.	*
Libellula	*	*	*	* Polynesia.	*	*	*
Phryganea (*note* 2)	*	*	...	...	...	...	?
Bittacus....................	*	*	*	*	*	*	*
Myrmeleo	*	*	*	*	*	*	*
Leuctra	*	*					
Ictinus	...	...	...	...	*	*	

Note 1.—*Termes.* Almost entirely tropical now; but two or three small species still survive in Europe (France, &c.).

Note 2.—*Phryganea.* Used in the sense of Phryganidæ; *Phryganea* itself only occurs in the Europeo-Asiatic and North-American districts.

4. *Hymenoptera.*

Genera.	Europe and Asia.	North America.	Australia.	Chili.	India.	Africa.	Brazilian region.
Xylocopa	*	*	*	*	*	*	*
Osmia.......................	*	...	...	...	...	S.Afr.	
Bombus	*	*	...	*	*	...	*
Anthophora	*	*	*	*	*	S.Afr.	*
Apis	*	...	...	...	*	*	
Vespa	*	*	...	...	*	...	
Formica.....................	*	*	*	*	*	*	?
Ponera	*	...	*	...	*	*	*
Myrmica	*	*	*	*	*	*	*
Pompilus	*	*	*	...	*	...	*
Ichneumon	*	*	*	*	*	*	*
Anomalon	*	*	*	...	...	*	*
Cryptus.....................	*	*	*	*	*	*	*
Acœnites....................	*	*					
Hemiteles	*	*	*				
Tenthredo	*	*	. .	...	*	*	*

5. *Lepidoptera.*

Genera.	Europe and Asia.	North America.	Australia.	Chili.	India.	Africa.	Brazilian region.
Vanessa (*note* 1)............	*	*	*	*	*	*	
Psyche (*note* 2)	*	*	*	...	*	S.Afr.	*

There are also four new fossil genera, which Heer calls *Pierites*, *Bombycites*, *Noctuites*, and *Phalænites*, which, he says, were respectively allied to *Pieris*, *Bombyx*, and the old genera *Noctua* and *Phalæna*, which are generally distributed.

Note 1.—Also found in the Navigator Islands.

Note 2.—*Psyche*. Used in the sense of Psychidæ. The recorded species of the restricted genus *Psyche* are confined to Europe and Ceylon.

6. *Diptera.*

Genera.	Europe and Asia.	North America.	Australia.	Chili.	India.	Africa.	Brazilian region.
Chironomus	*	*	...	...	...	...	* Columb.
Tipula (*note* 1)	*	*	*	*	*	*	*
Rhipidia	*	*					
Limnobia	*	*	*	*	*	*	*
Mycetophila	*	*					
Sciophila	*	*	...	...	...	...	*
Sciara	*	*	...	...	...	*	*
Rhyphus	*	*	...	* N.Z.	...	...	*
Plecia........	*	*	...	..	*	...	*
Bibio (*note* 2)...............	*	*	*	*B.Ay	...	*	* Columb.
Asilus	*	*	*	*	*	*	*
Leptogaster	*	*	*	...	*	*	*
Syrphus....................	*	*	*	*	*	*	* Columb.
Echinomyia	*	*	...	*	*		
Anthomyia.................	*	*	*	*B.Ay	*	*	
Cordylura	*	*			*		
Tephritis	*	*	*	*		*	*
Merodon	*	*	*	...	...	*	

Note 1.—*Tipula*. Also occurs in New Zealand.

Note 2.—*Bibio*. Ditto.

7. *Hemiptera.*

Genera.	Europe and Asia.	North America.	Australia.	Chili.	India.	Africa.	Brazilian region.
Pachycoris (*note* 1)	*	*	...	...	*	*	*
Tetyra (*note* 2)	*	*	...	...	...	*	
Cydnus	*	*	...	...	*	*	*
Phlœcoris (*note* 3)	...	...	...	...	...	...	*
Pentatoma	*	*	...	...	*	*	*
Ælia	*	*	...	...	*	*	
Halys (*note* 4)	*	*	*	...	*	*	*
Eurydema	*	*		.			
Eusarcoris	*	*					
Acanthosoma	*	*	...	...	*	...	*
Spartocerus (*note* 5)	...	...	...	...	...	...	*
Alydus	*	*	...	...	*	...	*
Hypselonotus (*note* 6)	...	...	...	...	*	*	*
Syromastes	*	*	...	...	*	...	*
Lygæus	*	*	*	...	*	*	*
Cephalocoris (*qu.* Cephalocterus?)	...	...	...	...	...	?	
Pachymerus	*	*	...	..	*	*	*
Heterogaster (*note* 7)	*	*	...	...	*	*	
Aradus	*	*					
Tingis	*	*	...	*	...	*	
Nabis	*	*	...	...	...	*	
Harpactor	*	*	...	...	*	*	
Pirates	*	*	...	...	*	*	*
Prostemma	*						
Evagoras	...	*	...	...	*	...	*
Nepa	*	...	...	...	*	*	
Diplonychus	*	...	...	...	*	*	
Naucoris	*	*	...	...	...	*	*
Corisa	*	*	...	...	*	*	
Micropus	*	*					

General Explanation.—In the above Table the genera are taken in the sense in which they were employed by Burmeister.

Note 1.—*Pachycoris.* Burmeister's genus *Pachycoris* included European and Old-World forms; but these are now cut off, and the genus confined to American forms; yet there is little doubt that Heer used the word in its old and wider sense.

Note 2.—*Tetyra.* Heer, in this, doubtless meant the genus *Eurygaster*, Lap.

Note 3.—*Phlœocoris*, Burm.=*Phlœa*, Le P. and Serv., is exclusively South American.

Note 4.—*Halys.* Burmeister makes *Halys* very nearly equivalent to Dallas's group Halydidæ, in which case it is represented in both hemispheres; but the principal and more typical forms

are found in the Old World; two or three species occur in the south of Europe.

Note 5.—*Spartocerus*. If this genus is confined to *Spartocerus* proper, it seems to be exclusively American.

Note 6.—*Hypselonotus*. The same remark as on *Spartocerus*.

Note 7.—*Heterogaster*. This probably includes *Nysius* and *Cymus*.

8. *Homoptera*.

Genera.	Europe and Asia.	North America.	Australia.	Chili.	India.	Africa.	Brazilian region.
Cicada	*	*	**	...	*	*S. Afr.	* *
Pseudophania	*	*	...	...	*	*	*
Tettigometra	*	...	...	...	...	*	*
Cercopis	*	*	*	...	**	...	*
Aphrophora	*	*	*	*	*	*	*
Tettigonia	*	*	*	*	*	Madg.	*
Acocephalus	*	*	...	...	*	S. Afr.	*
Bythoscopus	*	*	*	...	*	*	*
Typhlocyba	*	*	...	...	...	S. Afr.	
Aphis	*	*					
Lachnus	*	?					
Pemphigus	*	*					

9. *Arachnoidea*.

Genera.	Europe and Asia.	North America.	Australia.	Chili.	India.	Africa.	Brazilian region.
Limnocharcs (*note* 1) ..							
Argyroneta..................	*						
Gea (*note* 2)	...	...	...	...	*		

Note 1.—Information defective.

Note 2.—There is an East-Indian genus named *Gea*, but if the remarks by Dr. Thorell of Upsala (an able araneologist) are to be relied on (see 'On European Spiders,' by T. Thorell, Upsala, 1870, p. 225), the fossil spider *Gea* is a different species and genus from the existing East-Indian species *Gea spinipes*; and if so, *Gea* has no existing representative genus, though the family (*Epeïrides*) is most numerous and diffused over the whole known globe.—O. P. CAMBRIDGE.

To the foregoing we may add the following, to complete the notice of Heer and Krantz's lists, which go no further, viz.:—

10. *Crustacea.*

Genera.	Europe and Asia.	North America.	Australia.	Chili.	India.	Africa.	Brazilian region.
Daphnia............	*	*	*	*	*	*	?

11. *Polypi.*

Hydra	*	*					
Lucernaria..................	*	...	*				

TABLE II.—Showing the geographical distribution of the genera found in the middle and eastern (or next to America) portion of Polynesia.

Those which I suppose to have been introduced from microtypal sources subsequently to the establishment of the Brazilian and African types are marked with a †.

M. stands for Miocene, the genus being in Heer's lists.

TABLE II. (*continued*).

Genera.									
Placusa									
Staphylinus									
Philonthus					*				
Sunius									
Zirophorus...............									
Lispinus...................									
Isomalus									
Chrysodema									
Eurythyrea									
Agrilus				*					
Photophorus (peculia nesia, but allied to which is Brazilian)							*		
Dicrepidius (doubtful genus, see Candèze)									
Monocrepidius			*						
Simodactylus, allied tylus									
Oophorus (the old genus had no good charac Candèze has broken partitioned its conte possible to say where insects should go; (self does not say, *Heteroderes*)									
Adelocera									
Cylidrus									
Tarsostenus									
Tillus (*Clerus* is the nus, but it may be he *Tillus*)	M	•	•	•	•	..		•	•
Corynetes		•	•	•	•	•	•	•	•
Carpophilus		•	•	•	•	...	•	•	•
Nitidula		•	•	•					
Epuraea	M.	•	•						
Stelidota			•	?		..	?	?	
Anthrenus		•	•		•				•
Dermestes	M.	•	•	•	•	•	?	?	•
Platysoma		•	•		•			•	•
Paromalus....		•	•					...	•

Table II. (*continued*).

Genera.	Doubtful.	Cosmopolitan.	Microtypal stirps.					Brazilian stirps.	Indo-African stirps.	
			Europe and Asia.	North America.	Chili.	New Holland.	New Zealand.	Brazilian region.	India.	Africa.
Hydrobius .... M.	...	.	*	*	..	*	.	..	...	†
Philhydrus .... M.	...	...	*	*	*	...	.	...	*	*
Cyclonotum ...	...	...	*	*	*	...	...	*	*	*
Aphodius ... } Oxyomus .... }	...	...	*	*	*	*	...	*	*	*
Oryctes	...	...	*	...	...	*	...	...	*	*
Figulus	...	..	...	...	...	*	...	...	*	*
Dorcus (Alcimus)	...	..	*	*	*	*	*	*	*	
Passalus....	..	...	...	*	*	*	...	*	*	*
Opatrinus? (real genus doubtful)	*									
Leichenum	...	...	*							
...	...	...	*	*	...	...	*	..	†	
allied to Lacordaire)	*									
Heterophaga (the species cited is cosmopolitan)	.	*								
Uloma .... M.	.		*	*	.	.	*	*	*	*
Tribolium	.	*								
Cerandria	..	*								
Amarygmus	...	...	..	...	...	*	...	...	*	
Olisthæna	...	...	..	..	...	*				
Anthicus	.	...	*	*	..	...	.	...	?	
Mordella	.	..	*	*	*	*	?	*	†	
Zonitis	...	...	*	*	.	*	...	..	†	†
Nacerdes			*	...		*	*	†	†	
Selenopalpus.	...	.	..	...	..	.	*			
Dinema	.	...	...	...	..	..	..	.	*	
Rhinobrachys (supposed by Lacordaire to be near *Protedus*, Pasc., a New-Guinea form)	*									
Tropideres	.	.	*	*	*	*	.	†	†	*
Sphærorhinus (Trigonops | Celeuthetes . { Psomeles .... | Elytrurus .. (										
Acicnemis									*	
Cryptorhynchus .... M.			*	*	*	*		*	†	†
Tylodes (doubtful, *fide* Lacordaire, probably should be *Acalles*) .... M	*									

TABLE II. (*continued*).

TABLE III.—Showing relations of genera found in New Caledonia. (From Montrouzier's Essay in Ann. S. Ent. 1860.)

TABLE III. (*continued*).

Genera.	Microtypal.		Indo-African.	Brazil.	Universal.
	Europe, Asia, and N. America.	Australia.			
Onthobium (near *Tessarodon*)	...	*			
Aphodius	*	*	*	*	*
Sphæridium	...	...	*		
Rhizotrogus	*	*	*	*	*
Cyclocephala	...	...	...	*	
Hexodon	...	*			
Scarabæus	*	*	*	*	*
Ceratophyus	*				
Oryctes	...	...	*	*	
Megalæmus, n. gen.					
Lucanus	*	*	*	*	*
Rysssonotus	...	*			
Figulus	...	*			
Passalus	...	...	*		
Opatrum	*				
Toxicum					
Acanthosternus		...	*		
Neomida	*				
Diaperis	*				
Leptomorpha	*				
Pachycerus, n. gen.					
Tenebrio	*	*	*	*	*
Uloma	*	*	*	*	*
Tribolium	*				
Trogosita ?	*	*	*	*	*
Megapalpus, n. gen.					
Isopus, n. gen.					
Phaleria	*				
Adelium	...	*			
Ditylus	*				
Lagria	*	*	*	*	*
Mordella	*				
Telephorus	*				
Nacerdes	*				

List of non-microtypal Species in the Coleoptera of Polynesia, and their sources (all the rest are microtypal).

I. North America.—*Clytus erythrocephalus* and *Ptychodes vittatus*, Longicorns (timber-borers).

II. Brazil.—*Lagocheirus araneiformis* and *Steirastoma stellio*, Longicorns (timber-borers); *Brenthus bidentatus*, a Brenthid (timber-species).

III. East Indies and Philippine Islands.—*Chlænius guttatus*, a Carabid (carnivorous hunting insect); *Hesperophanes luzonicus*, Longicorn (timber-borer); *Figulus fissicollis* (Lucanid), *Apate religiosa* (Xylophage), and *Eurythyrea scutellaris* (Buprestid)—timber-insects.

IV. New Holland.—*Oopsis nutator*, Longicorn (timber-borer); *Amarygmus hydrophiloides*, Heteromere, and *Apate pusilla*, Xylophage (timber-insect); *Nacerdes bivittata*, Heteromere, and *Staphylinus erythrocephalus*, Staphylinid (microtypal).

V. New Zealand.—*Dendrophagus suturalis*, Cucujid (bark-insect); *Staphylinus oculatus*, Staphylinid (microtypal).

VI. Cosmopolitan, origin doubtful.—*Plochionus bonfilsii*, Carabid.

List of Genera and Species found in the Europæo-Asiatic regions, and also in North-west America, but not in the eastern side of North America.

I. Genera.—*Callisthenes*, *Miscodera*, *Leistus*, *Trachypachys*, *Pelophila*, *Anillus*, *Necrophilus*, *Pteroloma*, *Lyrosoma*, *Sphærites*, *Bolitochara*, *Syntomium*, *Phlœonæus*, *Arpedium*, *Deliphrum*, *Malachius*, *Calcar*, *Rosalia*, *Ergates*, *Mesosa*, *Timarcha*.

II. Species belonging to other genera than the above.—*Platynus Bogemanni*, *Carabus Vietinghovii*, *Colymbetes dolabratus*, *Necrophorus mortuorum*, *Olisthærus megacephalus*, *Elater nigrinus*, *Corymbites confluens*, *Helodes variabilis*, *Dinoderus substriatus*, *Serropalpus striatus*, *Chrysomela lapponica*, *C. viminalis*.

List of Genera of Coleoptera of Old Calabar either Brazilian or with Brazilian affinities, taken from my "Coleoptera of Old Calabar" (so far as published) in the 'Annals and Mag. of Nat. Hist.'

Galerita, *Lia*, *Goniotropis*, *Hypolithus*, *Celina*, *Contipus*, *Axyra*, *Taracta*, *Platychora*, *Melittoma*, *Ptilodactyla*, *Dilobotarsus*, *Belionota*, *Parandra*, *Dorycera*, *Callichroma*.

Brazilian section.—*Œme*, *Œdenoderus*, *Trachelophanes*, *Distenia*, *Smodicum*, *Stenochia*.

Note.—The other Tables referred to in the body of this paper, and which accompanied it, relate to matters which are more generally admitted; and it has therefore not been thought necessary to print them.

On a new Form of Cephalopodous Ova.

By CUTHBERT COLLINGWOOD, M.A., F.L.S., &c.

(PLATE I.)

[Read February 3, 1870.]

THE large grape-like masses which constitute the ova of the common Cuttlefish (*Sepia*), are of so remarkable a form, and so commonly met with, that they attracted attention very long since. Aristotle, whose acquantance with the reproductive bodies of the Tetrabranchiates was not far behind that of the present day, was no stranger to these large and singularly formed bodies; and they are commonly taken as the type of the spawn of Cephalopods. But the ova of this group differ considerably in size and appearance, as well as in the numbers produced by a single individual. In the case of *Sepia*, nature seems to have taken special care to preserve these important bodies, having encased them in a flexible horny covering, prolonged at one extremity into a kind of tendril or filament, which entwines round some fixed object which serves an anchorage. In the Poulp (*Octopus*), Aristotle informs us that a shell, or some such convenient *nidus*, receives the eggs, which adhere to it and are thus in some degree, at least, protected from injury. In *Loligo*, &c., great numbers of ova are produced: cylindrical sheaths of a gelatinous consistence are formed, each about 4 inches long and about ½ inch in diameter, and tapering at the free ends, the opposite ends being all attached to some foreign body by filamentary processes from ½ an inch to an inch in length. In each of these radiating bodies there may be 200 capsules, each of which contains from 30 to 40 minute spherical ova. In *Sepioteuthis* there appears to exist an intermediate form of ova, which connects the radiating sheaths of *Loligo* with the large capsular ova of *Sepia*. The ova are (as in *Loligo*) spherical, and enveloped in sheaths; but, as in *Sepia*, these are fewer and longer; while in the Dibranchiates the ova occupy a considerable space at the bottom of the shell, as, for example, in *Argonauta*.

In none of these, however, which represent the characters of of the Cephalopodous ova, as far as known, is there any approach to the characters of a remarkable body which I recently discovered in the Atlantic Ocean, the nature, however, of which was incontestable. We were becalmed in lat. 37° N. and

upon the central parts—an effect more apparent than real, and depending upon the cylindrical form of the mass. Although only half of the original mass was secured, the soft jelly having divided in getting it into the bucket, it had the appearance of an entire body, the fracture of the gelatinous mass not interfering with its symmetry.

Turning my attention now to the black spots, I at once saw, even without the aid of a lens, that they were egg-sacs containing young Cephalopods. These were extremely active, moving freely in the sacs and contracting their bell-shaped bodies as they leaped about in their narrow chambers. Each egg-sac was perfectly spherical and transparent, the circumference alone being visible, and was imbedded in the soft gelatinous transparent mass just as is the case with the spawn of the frog. The dark-coloured spots were entirely due to the coloured bodies of the embryo animals, which, in most cases, appeared to be just ready to be extruded. On placing the embryos under the microscope, I found that some of them were almost transparent, and exhibited their internal organization. The external surface of the bell was covered with epithelium of columnar form; and the same structure also extended over the arms. The bell was covered with dark-coloured spots—which in the most immature specimens were mere minute round specks, becoming in a further advanced condition irregular and angular as well as of a larger size. The eyes were large and prominent, and seated upon short and thick footstalks, and their dark pigmentary substance was distinctly visible through the transparent bell of the younger individuals. The arms were short, covered with epithelium upon the convex side, and having a few rudimentary acetabula upon their concave surfaces. Upon the upper part of the bell, on either side, was a small fin-like projection, visible even in the least-mature specimens.

Having secured this curious body, and examined its general form and appearance, and placed some of the embryos under the microscope, I was under the necessity of leaving it in a bucket of sea-water for two or three hours. When I returned to it at the expiration of that time, it appeared to have vanished. In some astonishment, I put my hand into the water, and found therein a large mass of soft transparent jelly, entirely invisible in the water. On closer inspection, I discovered that every one of the young embryos had been discharged from its sac, and that they

were lying in little heaps at the bottom of the bucket, either dead or dying. They had entirely lost the active movements which had at first distinguished them; and an occasional contraction of the bell was the only sign of life which any of them exhibited. Those which I had myself separated from the mass, and previously placed in a tumbler of water, were by far the most lively; and from these the accompanying figures were made.

On no other occasion did I meet with a body of this nature; and the only thing I ever saw approaching to it in form was in the Indian Ocean, north of the Equator, when I one day observed something of the kind pass by, which had been a puzzle to me ever since; for the rate at which we were steaming (ten knots) rendered it impossible to take any accurate note of it. Nor should I have been able to guess the character of the body I have here described, had I not been so fortunate as to secure it for closer examination.

The very great contrast which this body offers to the known forms of the spawn of Cephalopods in general is very remarkable; and its singular resemblance to the spawn of the Amphibia is no less worthy of attention. What this may signify is a matter of interesting consideration. The embryo stages of this animal (of which I have preserved a few) will, of course, offer some, though a very imperfect, clue to its adult form, and to the determination of its genus. The presence of fin-like projections upon the upper portion of the bell seems to point out its separation from the genera *Eledone*, *Octopus*, *Tremoctopus*, and *Argonauta*, though to which of the pinnated genera (*Histioteuthis*, *Sepiola*, *Rossia*, *Sepia*, *Sepioteuthis*, *Verania*, *Onychoteuthis*, *Enoploteuthis*, *Loligo*, and *Loligopsis*) it may belong, or whether to some new genus, cannot now be determined. The body was evidently perfect in itself, and perfectly symmetrical; and it is curious to observe so large a mass, and such a vast quantity of animals as the product of a single individual. Probably in it, as in the Frog during the breeding-season, the ovaries occupy the greater part of the body; and probably, also, as is the case with the Frog, when the ova are deposited in the water, the jelly-like substance in which they are enveloped absorbs a large quantity of the fluid, so that the whole mass rapidly increases in volume until it becomes many times as large as the animal from which it was expelled.

These interesting questions may, it is hoped, yet be elucidated, and the affinities of the animal determined. In the mean time I have thought it best to bring forward the fact for the information of zoologists and physiologists.

DESCRIPTION OF THE PLATE.

A, natural size of ova. B, C, young cuttles under a 2-in. object-glass (24 diam.). D, an embryo, as seen under a 1-in. glass. E, F, arms (¼ in.), showing the rudimentary acetabula.

Description of some new Species of Annelida and Gephyrea in the Collection of the British Museum. By W. Baird, M.D., F.R.S., &c.

[Read April 7, 1870.]

ANNELIDA.

1. Nephthys Macandrewi, *Baird.*

Body elongate, tapering towards the inferior extremity, which terminates in one rather long seta. The sides containing the dorsal feet strongly ridged across. Proboscis rather short and rounded. Setæ of upper lobe of feet few in number and serrated near the tip; rather shorter and broader than those of ventral lobe, which are numerous and not serrated on the edges. Colour of the dorsal region, in the centre, of a pinkish hue.

Length about 6 inches.

Hab. Coruña, *R. M'Andrew* and *H. Woodward, Esqs.*

2. Nephthys impressa, *Baird.*

Body of a yellowish colour. Dorsal and ventral regions smooth, of a pearly, somewhat iridescent hue. Ventral surface marked with a bluish impressed line in the centre. Head small; antennæ indistinct. Proboscis rather long, cylindrical. Papillæ on the summit of it, round the mouth, rather large and fleshy, disposed in a series of 12 on each side. Feet on upper part of body small and close-set, becoming larger and more separate as they descend. Lamellæ ovate. Setigerous lobe rather large. Superior branchial process involute, large, twisted once and a half round. Setæ of setigerous lobe of three kinds:—one, short, curved at the tip and beautifully and minutely jointed; a second, simple, long, and slightly serrated on the outer edge; and the third, long, compound, the edges of the appendage minutely toothed on the edge, as is also the top of the shaft.

This species resembles very much the *Nephthys longisetosa*,

the chief differences being in the ventral cirrus or branchial process, the more decidedly serrated setæ, and the habitat.

Length about 4 inches.

Hab. Loto, coast of Patagonia, *Dr. Cunningham.*

3. Nephthys lutrea, *Baird.*

This species is considerably smaller than the preceding, but resembles it in most respects. The setæ of the feet are long; but instead of being serrated on one edge, they are divided across in numerous small joints or articulations.

In length it is only 2 inches.

Hab. Otter islands, coast of Patagonia, *Dr. Cunningham.*

4. Clymene grossa, *Baird.*

Body of a straw-yellow colour, much wrinkled on the surface, and thick. Head-lobe of considerable size and much wrinkled. Cephalic plate large and crenate on the upper edge; crenations about 12 in number, each crenation again having two slight crenations on the summit. First segment of body without setigerous feet. Three following segments with a fascicle of setæ only. The middle ones with a fascicle of setæ, and a lobe possessing numerous very short setæ on it.

Unfortunately the two Museum specimens are imperfect at the inferior portion.

Hab. Straits of Magellan, *Dr. Cunningham.*

5. Clymene insignis, *Baird.*

Body elongate; thickest in the middle, which exhibits a sort of sheath or tube in which the worm lives. Cephalic lamina very small, entire. Posterior extremity obliquely truncate, with no infundibuliform appendage. Segments of body very indistinct; one or two, of the anterior portion, without setæ; the other segments possess two rami. The anterior half of the body, exhibiting these setæ, is very large, and the setæ are very long and filiform. Posterior portion of body has the fasciculi of setæ small.

Hab. —— ? Taken during the Congo Expedition.

6. Siphonostoma antarcticum, *Baird.*

Setæ surrounding the head numerous, very short and fine. Branchiæ short, numerous. Head withdrawn. Body covered with an enveloping substance like that of most of the known species. Setæ of the inferior ramus of feet single, crooked or

hooked at the point, and of nearly a black colour. Colour of body varying from a very dark to a light brown, and of a transparent look.

Length of body in longest specimen nearly 8 inches.

Hab. New Zealand, *Dr. A. Sinclair.*

7. MAGASCOLEX (PERICHÆTA) ANTARCTICA, *Baird.*

Body consisting of about 180 rings. Setæ, surrounding the body, short, black, rather distant. Rings not keeled; larger and more distinct at the anterior extremity, closer at the posterior end, and all smooth.

Length 7 inches.

Hab. New Zealand.

8. MEGASCOLEX (PERICHÆTA) SANCTÆ-HELENÆ, *Baird.*

Body consisting of about 86 rings, which are more distinct at the two extremities than in the centre. The 11 or 12 rings at each end, have an acute ridge or keel in the centre; those of the middle portion of the body have the keel flattened. The body of the rings is finely striated. Setæ short, of a dark colour at the posterior extremity, rather distant from each other. In the centre of the body and at the anterior extremity they appear (in the specimen from which this description was drawn up) retracted, leaving only a mark where they are situated. The first 7 or 8 rings, at the anterior extremity, are strongly rugose or wrinkled.

Length from 1 inch and 9 lines to 3 inches.

Hab. High ground at St. Helena, *J. C. Melliss, Esq.*

9. LUMBRICUS JULIFORMIS, *Baird.*

Body of about 120 rings. Of a nearly black colour with metallic reflections. Rings smooth, narrow, close-set, slightly keeled in the centre. Setæ in four double rows, two ventral and two dorsal. Body of about equal size at each extremity. Lower extremity conical, pointed. The 10 or 11 anterior rings are the largest.

Altogether this worm resembles very much in appearance a species of *Julus.*

Length of medium-sized specimen 2½ inches.

Hab. ——? Collected during the Antarctic Expedition.

10. LUMBRICUS GUILDINGI, *Baird.*

Body consisting of about 160 rings, narrow and close set

together. Setæ in four double rows on the back, each row very much approximated. No setæ on ventral surface. Colour of a pale straw hue. Rings have the surface corrugated; and the anterior ones are each slightly keeled in the centre.

Length 2 inches and 3 lines.

Hab. Island of St. Vincent, West Indies, *Rev. Lansdown Guilding's Collection.*

11. Lumbricus rubro-fasciatus, *Baird.*

Body of a dirty yellow colour, banded across the back with a broad fascia of a red hue. The ventral surface is yellow. The red band extends across the centre of the segments. Anterior and posterior extremities both obtuse.

Length between 2 and 3 inches.

Hab. St. Helena, *J. C. Melliss, Esq.*

GEPHYREA.

1. Aspidosiphon Jukesii, *Baird.*

Body nearly smooth, of a light straw-colour. Anterior shield dark, slightly granular, more slender than the posterior, which is of a lighter hue, and radiately granular. Granules very small.

Length about ½ an inch. Circumference about 3 lines.

Hab. Imbedded in a piece of coral from Lee Sandbanks, dredged in 14 fathoms, *J. B. Jukes, Esq.*

2. Echiurus farcimen, *Baird.*

This is a very large species, the middle-sized ones resembling in general appearance a large sausage. The two spines on the anterior portion are large and well developed. The hinder portion exhibits only one row of spines, instead of two as in most of the known species. The skin is leathery and smooth; the two extremities are bluntly pointed. The longest specimen we possess is about 16 inches long, the shortest fully 7 inches in circumference.

Hab. We possess five specimens of this species, all from Punta Arenas, on the coast of Patagonia. Collected by Dr. Cunningham, of the Surveying Expedition to the Straits of Magellan, to whom we are indebted for several species of Annelides above described.

On new Forms, &c., of extra-European Trichopterous Insects.

By Robert M'Lachlan, F.L.S.

(Plates II., III. & IV.)

[Read June 2, 1870.]

The present paper may be regarded as a continuation of several memoirs by me on exotic *Trichoptera*, published in the 'Transactions of the Entomological Society of London' (Trans. Ent. Soc. ser. 3, vol. i. pp. 301–312, 492–496, vol. v. pp. 247–278). Many of the insects here noticed I owe to the liberality of my valued correspondent Mr. Henry Edwards, of San Francisco, from whom I had already, during his residence in New Zealand, received such substantial evidence of his desire to assist me by collecting these neglected insects, and who, since he has made Western America his home, has continued to help me. I have not, however, confined myself here solely to Californian species, but have added several remarkable forms from other parts of America, and also from the Old World. No doubt it is always advisable to restrict general papers of this nature within geographical limits; but this applies most forcibly to families which have already been made the subjects of general study. To follow this plan in exotic *Trichoptera* would be almost impossible, inasmuch as, though occasionally a considerable number of species may be collected in one locality by an entomologist who attends to other insects besides the almost hackneyed Butterflies and Beetles, many interesting forms must remain unnoticed in collections for years, because they are the results of only desultory observation on the part of collectors. This, therefore, must be my excuse for the scattered nature of the materials in this paper. When the day shall arrive when Neuropterists may be as plentiful as Lepidopterists, Coleopterists, and even Hymenopterists now are, it will then be absolutely necessary that workers should confine themselves, in each paper, within limits, either of locality, or family, or genus; to do that now would put a stop to all work, because, by the omission of any notice, collectors would fail to bestow any attention whatever on these insects, and the evil would be increased rather than mitigated. As in previous papers, I have endeavoured to illustrate by means of outline figures those intricate points of neuration and secondary sexual characters which form so essential a part in the

Dr. Packard's arrangement is founded on the idea that in insects, as in all other divisions of the animal kingdom, there are certain groups more elevated, others more "degraded," than the rest. Acting upon this, he places the *Hymenoptera* as structurally and psychically, if I may use the term, superior to all other insects. Then follow *Lepidoptera*, *Diptera*, *Coleoptera*, *Hemiptera*, *Orthoptera*, and, last of all, the *Neuroptera*, in the Linnean sense (but including *Thysanura*), an order which, according to him, "mimics every suborder of insects," being "comprehensive or synthetic types, combining the structure of all the other suborders." I would here particularly call attention to the relative positions occupied by *Lepidoptera* and *Trichoptera*, the latter forming nearly the last division of *Neuroptera*. I emphatically enter my protest against such a wide separation of the two groups, considering, as I do, that, whatever may be the condition of the *Trichoptera* with regard to others of the Linnean groups of *Neuroptera*, their relationship to the *Lepidoptera* is close, and that an attempt to thus widely separate them is an outrage on both. In metamorphosis the resemblance is nearly complete, the fact of the pupal limbs not being enclosed within a common integument not availing much when their condition in certain *micro-Lepidoptera* is taken into consideration: the possession of mandibles by the Trichopterous nymph is not of much importance, inasmuch as these organs bear no relationship to the aborted mandibles of the imago; they simply replace the acid or mechanical means by which a Lepidopterous imago frees itself from its cocoon. The imago in *Lepidoptera* is almost constantly furnished with scales on the wings and body, scales of a peculiar nature, the analogues of which are seen only in *Lepisma*; but many Trichopterous insects have, in the male, a modification of these scales in the form of short inflated hairs, generally intermingled with ordinary hairs; and in some genera this tendency towards a scaly clothing is as marked as is its absence in some *Lepidoptera*. The neural arrangement is not at all incompatible with a close relationship; nor are the parts of the mouth, excepting the absence of a developed haustellum: yet many of the larger *Trichoptera* frequent flowers for the purpose of extracting the nectar; and though I am unable to say by what means this is effected, it seems probable that it is done by prolongation, at will, of the upper portion of the œsophagus into a sort of false haustellum. Perhaps the

strongest mark of demarcation is the presence, in most Lepidopterous imagos, of a spine-like process near the base of the costa of the hind wings, wanting in all *Trichoptera*. That this process is a modification of a vein is almost certain; and I apprehend that, when the homologies of neuration are better understood, this negative character in *Trichoptera* will not be found of much importance. My own inclination tends strongly towards maintaining *Trichoptera* as a separate order in juxtaposition with *Lepidoptera*; and I am thus content to share the pity bestowed by the reviewer of Huxley's 'Introduction to the Classification of Animals,' in the 'American Naturalist' (a journal receiving Dr. Packard's inspiration) for November 1869, by whom we are told that (p. 545), "the strangest, and, humanely speaking, saddest feature of this classification, is recognizing the Neuropterous family Phryganeidæ as a distinct order (*Trichoptera*)." In a division of insects such as the Linnean *Neuroptera*, which is so thoroughly heterogeneous, much allowance should be made for differences of opinion, and it is scarcely fair to bestow such dogmatic censure upon any system, however opposed it may be to individual convictions.

Family PHRYGANEIDÆ.

The following is an attempt at a systematic and synonymic catalogue of all the described species of this family, taken in its limited sense. The genera are not well-defined, notwithstanding the size of the insects, the neural characters not being sufficiently stable, or rather, perhaps, the materials at present in hand being too meagre, to enable me to draw lines of demarcation absolutely satisfactory. A few notes on the general characters are here given.

Colpomera, M'Lachlan, which I was inclined to place as a section of *Phryganea* in its limited sense, on account of the strong facial resemblance of the type to *P. japonica*; is evidently a good genus. The general characters are as in *Phryganea*; but the anterior wings are narrower, the apex being falcate, the apical margin strongly excised. The apex of the abdomen of the female (which sex I have only recently seen) is produced into a telescopic tube, indicating some peculiar mode of life, and quite different from the blunt apex of *Phryganea*. The neuration differs in the sexes, as in *P. grandis* and allies.

Phryganea, Linné (as restricted), has moderately narrow anterior wings, the apex of which is rounded, oblique, or slightly sinuate. In the typical species there is an additional apical cellule in the ♀ in all the wings; but in a section of the genus the neuration is similar in both sexes, or as in the ♂ of the typical species (*Trichostegia*, Hag., Brauer); and in another section the anterior wings have the like neuration in both sexes, but the posterior wings possess an additional fork. The discoidal cell of the anterior wings is elongate in all.

Holostomis, Mannh., differs from *Phryganea* in its very broad anterior wings. In the typical species, the neuration of the anterior wings is alike in both sexes (similar to the typical forms of *Phryganea* ♂), but the posterior wings of the ♀ have an additional fork; *H. Maclachlani*, White, has the additional fork in all the wings of the ♀; and on this account I transferred it to *Phryganea*; but, in its form, it is evidently better placed here.

Neuronia, Leach, is scarcely to be separated from *Holostomis*: the species are, as a rule, smaller, with the discoidal cell shorter; but possibly the two genera should be united under *Neuronia*, which is the older name. The neuration of the anterior wings is alike in both sexes; but the posterior wings of the ♀ have an additional fork.

Agrypnia, Curtis, is distinguished by the narrow, Limnophiliform anterior wings, the neuration alike in both sexes, the spines of the tibiæ and tarsi few in number,—at present one of the best-defined genera.

COLPOMERA, *M'Lachlan*.

1. C. SINENSIS, *M'Lach. Trans. Ent. Soc. Lond.* ser. 3, vol. i. p. 302.
Hab. North China.

PHRYGANEA, *Linné* (restricted).

=*Trichostegia*, Kolenati.

A. *Alæ anticæ et posticæ fœminis furca apicali addita instructæ* (=*Phryganea*, Hag., Brauer).

2. P. JAPONICA, *M'Lach. Trans. Ent. Soc. Lond. ser.* 3, *vol.* v. p. 248.
Hab. Japan.

3. P. GRANDIS, *Linn. F. S.* 379; *Hag. Linn. Ent.* vol. v. p. 363.—

Trichostegia grandis, *Kol. Gen. et Sp. Trichop.* pt. 1, p. 84.—P. atomaria, *Steph. Ill.* vol. vi. p. 206.
Hab. Europe.

4. P. STRIATA, *Linn. F. S.* 378; *Hag. Linn. Ent.* vol. v. p. 363.—P. Beckwithii, *Steph. Ill.* vol. vi. p. 206.—P. fulvipes, *Burm. Handb.* vol. ii. p. 934.
Hab. Europe.

5. P. CINEREA, *Walk. Cat. Brit. Mus. Neurop.* pt. 1, p. 4; *Hag. Neurop. N. Amer.* p. 252.—P. divulsa, *Walk. Trans. Ent. Soc. Lond.* ser. 2, vol. v. p. 176 (locality erroneous).
Hab. North America.

6. P. VARIA, *Fab. Ent. Syst.* p. 77; *Pict. Recherch.* p. 160, pl. xi. f. 1.—Trichostegia varia, *Kol. Gen. et Sp. Trichop.* pt. 1, p. 86.—P. annularis, *Oliv. Encyc.* vol. vi. p. 558.—P. variegata, *Humm. Ess.* ii. p. 23.
Hab. Europe.

7. P. SORDIDA, *M'Lach. post.* p. 106.
Hab. Japan.

8. P. OBSOLETA (*Hagen*), *M'Lach. Trans. Ent. Soc. Lond.* ser. 3, vol. v. p. 16.
Hab. North and Central Europe.

B. *Alæ posticæ fœminis furca apicali addita instructæ.*

9. P. VESTITA, *Walk.*—Neuronia vestita, *Walk. Cat. Brit. Mus. Neurop.* pt. 1, p. 10, ♀.—P. vestita, *Hag. Neurop. N. Amer.* p. 253. —N. commixta, *Walk. l. c.* ♂.—P. commixta, *Hag. l. c.*
Hab. United States.

C. *Venæ alarum ant. et post. in utroque sexu ut in mare divisionis* A. (=*Trichostegia*, Hag., Brauer).

10. P. MINOR, *Curt. Phil. Mag.* 1834, p. 125; *B. E.* pl. cxii.—Trichostegia minor, *Kol. Gen. et Sp. Trichop.* pt. 1, p. 87.—P. mixta, *Burm. Handb.* vol. ii. p. 934.—P. tortriceana, *Ramb. Neurop.* p. 471.
Hab. North and Central Europe.

HOLOSTOMIS, *Mannerheim.*

A. *Venæ alarum ant. et post. ut in divisione* A. *Phryganeæ.*

11. H. MACLACHLANI, *White, Trans. Ent. Soc. Lond.* ser. 3, vol. i. Proc. p. 26.—P. Maclachlani, *M'Lach. Trans. Ent. Soc. Lond.* ser. 3, vol. v. p. 249, pl. xvii. fig. 1.
Hab. North India.
Var. REGINA, mihi (an sp. distincta?).
Hab. Japan.

B. *Alæ posticæ feminis furca apicali addita instructæ; venæ alar. antic. in utroque sexu ut in mare divisionis A. Phryganeæ.*

12. H. PHALÆNOIDES, *Linn.*—P. phalænoides, *Linn. F. S.* p. 378.—H. phalænoides, *Kol. Gen. et Sp. Trichop.* pt. 1, p. 82.—P. speciosa, *Lat. H. N.* vol. xiii. p. 86.—P. daurica, *Fisch. Ent. Russ.* p. 52, pl. (Neurop.) ii. f. 1.
Hab. North Europe.

13. H. ATRATA, *Lepech.*—P. atrata, *Lepech. Iter Sibir.* vol. ii. pl. x. f. 9.—H. atrata, *Hag. Ent. Ann.* 1859, p. 70.—P. altaica, *Fisch. Ent. Russ.* p. 52, pl. (Neurop.) ii. f. 2.
Hab. Lapland; Russia; Finland.

LEUCA, *M'Lach. post* p. 106.

variety of *H. Maclachlani*, from Japan, indicated
ıe of *regina*, is perhaps a distinct species. I have
female example, lent to me by Baron De Selys
It differs from the Indian specimens in the an-
ɪeing much narrower, elliptical at the apex; the
ɪese wings darker, the apical portion of each wing
rith few yellow irrorations; the costal spots elon-
livided; the basal portion of the hind wings much darker, blue-black, this colour extending further along the costal margin; the apical band broader; hence the yellow band is narrower, and there are no spots on the costal portion of this band: beneath, the dark portion of these wings is intensely blue-black.

NEURONIA, *Leach*

15. N. PARDALIS, *Walk. Cat. Brit. Mus. Neurop.* pt. 1, p. 7; *Hag Neurop. N. Amer.* p. 250.
Hab. Nova Scotia.

16. N. SEMIFASCIATA, *Say.*—P. semifasciata, *Say, West. Quart. Rep* ii. p. 161; *Amer. Ent.* vol. ii. p. 97, pl. xliv.—N. semifasciata, *Hag. Neurop. N. Amer.* p. 250.—N. fusca, *Walk. Cat. Brit. Mus. Neurop.* pt. 1, p. 9.—Ptilostomis Kovalevskii, *Kol. Gen. et Sp. Trichop.* pt. 2, p. 198, pl. i. f. 1.
Hab. North America.

17. N. POSTICA, *Walk. Cat. Brit. Mus. Neurop.* pt. 1, p. 8; *Hag. Neurop. N. Amer.* p. 251.
Hab. North America.

18. N. OCELLIFERA, *Walk. Cat. Brit. Mus. Neurop.* pt. 1, p. 8; *Hag. Neurop. N. Amer.* p. 252.
Hab. North America.

19. N. CONCATENATA, *Walk. Cat. Brit. Mus. Neurop.* pt. 1, p. 8.—N. irrorata, *Hag. Neurop. N. Amer.* p. 249 (*nec Fab.*).
Hab. North America.

20. N. LAPPONICA, *Hag.*—P. reticulata, var., *Zett. Ins. Lapp.* col. 1061 (*nec Linn.*).
Hab. Lapland; Island of Oesel.

21. N. RETICULATA, *Linn.*—P. reticulata, *Linn. F. S.* p. 378.—Oligostomis reticulata, *Kol. Gen. et Sp. Trichop.* pt. 1, p. 81, pt. 2, pl. v. f. 57.—N. reticulata, *Brauer, N. A.* p. 44.
Hab. North and Central Europe.

22. N. CLATHRATA, *Kol.*—O. clathrata, *Kol. Gen. et Sp. Trichop.* pt. 1, p. 82.—H. clathrata, *Hag. Ent. Ann.* 1859, p. 69.
Hab. North and Central Europe.

23. N. OCELLIGERA, *Walk. Cat. Brit. Mus. Neurop.* pt. 1, p. 8; *Hag. Neurop. N. Amer.* p. 259.
Hab. Nova Scotia.

24. N. STÅLII, *M'Lach. Trans. Ent. Soc. Lond.* 1868, p. 289.
Hab. Sweden.

25. N. RUFICRUS, *Scop.*—P. ruficrus, *Scop. Ent. Carn.* p. 690.—N. ruficrus, *Brauer, N. A.* p. 68.—N. fusca, *Steph. Ill. M.* vi. p. 234, pl. xxxiv. f. 2.—P. striata, *Burm. Handb.* vol. ii. p. 935.—Oligotricha chloroneura, *Ramb. Névrop.* p. 473.—Anabolia analis, *Kol. Gen. et Sp. Trichop.* pt. 1, p. 80.
Hab. Europe.

Note.—Walker's three species, *N. fusca, postica,* and *ocellifera,* are doubtfully distinct according to the types; the names are here used in accordance with the sense in which Hagen has applied them in his 'Neurop. N. America.'

N. concatenata is very closely allied to *N. lapponica*; *N. ocelligera* to *N. clathrata* and *N. reticulata*.

AGRYPNIA, *Curtis.*

26. A. PICTA, *Kol. Gen. et Sp. Trichop.* pt. 1. p. 79.
Hab. North Europe.

27. A. PAGETANA, *Curt. B. E.* pl. dxl.—P. ægrota, *Burm. Handb.* vol. ii. p. 935.—Oligotricha strigosa, *Ramb. Névrop.* p. 473.
Hab. North and Central Europe.

Note.—Two as yet undescribed species of *Agrypnia* in Hagen's

collection are noticed by name only, viz. *A. glacialis*, Hag., from North America, and *A. islandica*, Hag., from Iceland.

PHRYGANEA, *Linné.*

PHRYGANEA SORDIDA, nov. sp. *P. variæ* affinis, sed alis anticis latioribus, fusco-griseis fusco plus nebulosis; alæ posticæ ad apicem anguste fusco-limbatæ (♀).

Long. corp. 7½ lin. (=15 mill.); exp. alar. 18½ lin. (=39 mill.).

Hab. Japonia (in *Mus. auct.*).

Evidently allied to *P. varia*, and perhaps scarcely more than a form of that species. The insect, however, is more robust and rather larger; the anterior wings broader, more clouded with fuscous, especially in the basal half, which is almost entirely fuscous; the ground-colour brownish grey, instead of the whitish grey of *varia*; the hind wings with a narrow, smoky-fuscous, apical margin. The anal parts are similar to those of *varia*, only that the lateral lobes seem to be larger and more quadrate.

I have one female example, from Hakodadi.

HOLOSTOMIS, *Mannerheim.*

HOLOSTOMIS MELALEUCA, n. sp. *H.* atra, nitida. Pedes abdomenque sordide nigri. Alæ anticæ pallide stramineæ, punctis nigris sat densc conspersæ; posticæ albæ, maculis duabus costalibus ante apicem ornatæ, late fusco-limbatæ (♂). Long. corp. 7½ lin. (=15 mill.); exp. alar. 24 lin. (=50 mill.).

Hab. Japonia (*in Mus. Brit.*).

Head and *thorax* deep shining black (antennæ broken): palpi and legs dull black with a greyish tinge. *Abdomen* dull black: a long triangular superior median lobe, shining black, directed strongly downwards, notched at the acuminate apex, and bearing, before the apex, a needle-shaped process on either side: penis long, flattened, awl-shaped, testaceous (there are also two small testaceous processes which apparently belong to the app. sup.).

Anterior wings very pale straw-colour, rather densely irrorated with small black spots, some of which are confluent and form reticulations; two larger costal spots near the apex, some larger spots towards the inner margin; the apical margin regularly spotted; veins pale, except where they traverse the black markings. *Posterior wings* white, subopaque; a large wedge-shaped black spot on the costal margin above the discoidal cell, the point nearly reaching it; beyond this, nearly at the apex, a second large, irregular, black spot; one or two small black dots near the middle of the costa; apex and apical margin broadly fuscous, with a semilunate pale straw-coloured mark on the extreme margin in each apical cellule; veins pale.

There is one ♂ example in the British Museum, from Hakodadi. The species is evidently allied to *H. atrata*, Lepchn. (*altaica*, Fischer), but differs in its black legs, and in the complete, broad, fuscous margin of the hind wings.

Fam. LIMNOPHILIDÆ.

Grammataulius, *Kolenati*.

Grammataulius brevilinea, n. sp. *G.* fusco-niger, subtus griseo-ochraceus; capite, prothorace, mesothoraceque in medio lurido-rufis. Pedes griseo-flavi; tibiis tarsisque nigro-spinosis. Alæ anticæ angustatæ, elongatæ, ad apicem vix dilatatæ; margine apicali obliquo, paullo exciso; testaceæ, rufo-brunneo nebulosæ, pterostigmate, area suturali cellulaque apicali tertia fuscis, lineis duabus brevibus in area interclavali nigris; posticæ albidæ, hyalinæ, ad apicem flavescentes; cellula apicali tertia pallide fuscescente (♀). Long. corp. 8 lin. (=16 mill.); exp. alar. 20 lin. (=43 mill.).

Hab. Japonia (*in Mus. auct.*).

Head above lurid reddish, suffused with fuscous in the middle, quite flat, triangularly produced in front, truncate behind; face and palpi testaceous; eyes black, reticulated with grey, *Pronotum* large, transversely quadrangular, divided in the middle by a longitudinal line, reddish. *Mesonotum* broadly black at the sides, and with a broad longitudinal reddish middle band. *Metanotum* black, somewhat piceous. The whole under-surface of the body greyish ochreous. *Legs* greyish yellow, tibiæ and tarsi with numerous black spines, anterior femora sometimes fuscescent internally. *Abdomen* fuscous above, greyish ochreous beneath: in the female are two long, cylindrical, testaceous, divergent, finger-shaped appendices; beneath these a short, broad, up-directed plate, which is deeply excised at the apex, and two large, oval, obtuse, lateral valves (or inferior appendices). (Pl. II. fig. 1.)

Anterior wings long and narrow, the costal inner margins nearly parallel, the apex slightly dilated, the apical margin oblique, excised at the sixth apical cell: colour dull testaceous, suffused with pale reddish brown, the apical portion with paler irrorations; pterostigma fuscous, third apical cell fuscous with some pale dots, sutural area fuscous, but leaving the extreme inner margin pale; area interclavalis with two short longitudinal black lines; veins testaceous. *Posterior wings* broad, subhyaline, the apex and pterostigmatical region yellowish; third apical cellule suffused with pale fuscous; radius crossing the first apical sector at its extremity, forming a fork. (The neuration in each of my two examples is irregular: in one the third apical sector in both anterior wings, and in the right posterior wing, is furcate at its extre-

mity; in the other this sector divides from, or soon after, its commencement, and joins again before the extremity in all the wings, forming a long loop).

I have two females from Japan. It is a true *Grammataulius*, and a very strongly marked species.

STENOPHYLAX, *Kolenati*.

STENOPHYLAX GENTILIS, nov. sp. *S.* pallide testaceus. Antennæ pedesque testacei; tibiis tarsisque nigro-spinosis. Abdomen supra nigro-terminatum; appendicibus superioribus parvis, brevibus, fimbriatis, flavis; app. inf. sursum directis, fimbriatis, flavis, ad apicem nigro-truncatis, dentatis. Alæ anticæ elongatæ, gradatim dilatatæ, pallide flavæ, immaculatæ, subnitidæ; venis flavis; anastomosibus fuscis; margine apicali anguste obscuriore; posticæ pallidiores (♂).

Long. corp. 5½ lin. (=11 mill.); exp. alar. 17 lin. (=36 mill.).

Hab. America boreali (*in Mus. auct.*).

The whole body, including antennæ, palpi, and legs, testaceous; tibiæ and tarsi with black spines; eyes black. The last dorsal segment of the abdomen is conically produced at its apex, which is black and scabrous; app. sup. small, rounded, concave internally, yellow, and fringed with yellow hairs; app. intermed. black, truncate (?); app. inf. directed upwards, yellow, fringed externally with long yellow hairs, the apex black and truncate, furnished with small teeth.

Anterior wings elongate, broad, the apex parabolic, nearly uniformly pale yellow, almost nude, and shining, the membrane finely rugulose; inner margin (area suturalis) deeper yellow; apical margin narrowly obscure; veins yellow, the anastomoses fuscescent; a whitish dot at the thyridium, and another at the arculus. *Posterior wings* hyaline, tinged with yellow; anterior margin deeper yellow.

I have one male, from the White Mountains of New Hampshire, sent by Mr. H. Edwards, of San Francisco. The species is allied to the European *S. hieroglyphicus*, *striatus*, &c., in which the wings are elongate, and the first apical cell in the anterior pair scarcely longer than the succeeding cells.

S. LIMBATUS, nov. sp. *S.* rufo-testaceus. Antennæ testaceæ, fusco-cingulatæ. Pedes flavi. Abdomen supra fuscum, infra ochraceum; segmento ultimo lateraliter productum; app. sup. parvis, subquadratis, flavo-fimbriatis; app. inf. sursum directis, ad apicem truncatis, extus fimbriis longis instructis; app. intermed. elongatis, spiniformibus, rectis, ad apicem abrupte uncinatis. Alæ anticæ breves, latæ, ad apicem valde obtusæ, testaceæ; nebula in cellula thyridii (puncto albo ad thyridium incluso) maculis duabus (una ad basin cellulæ apicalis

secundæ, altera quartæ) limboque apicali intus dentato pallide brunneis: posticæ hyalinæ (♂).

Long. corp. 4½ lin. (=9 mill.); exp. alar. 12½ lin. (=26 mill.).

Hab. Terra Nova (*in Mus. auct.*).

Head and *thorax* reddish testaceous, with sparse reddish hairs; antennæ testaceous, with fuscous rings; palpi yellowish; eyes black. *Legs* yellow, tibiæ and tarsi with short black spines, a black point on each trochanter, internally. *Abdomen* fuscous above, ochreous beneath; margin of last dorsal segment regularly concave in front, produced at the sides into a triangular tooth, the upper edge of which is excised and beset with numerous very short black spiny hairs; app. sup. small, yellow, subquadrate, truncate, fringed with yellow hairs; app. intermed. long, in the form of two closely applied straight spines, the tips of which are suddenly curved downwards; app. inf. directed upwards, projecting beyond the lateral production of the segment, yellow, truncate at the apex, and fringed externally with long yellow hairs.

Anterior wings short and broad, much dilated at the apex; the apical margin oblique, pale testaceous, the membrane finely rugulose, nearly nude, and shining; a cloud in the cellula thyridii extending also above it, and there enclosing a white dot at the thyridium; two irregular spots, one placed at the base of the second, the other in a similar position in the fourth, apical cells, and a broad apical margin which is dentate internally (being produced into an acute triangle along each apical cell) pale brown; ramus clavalis margined beneath with brown; veins testaceous, with short concolorous hairs; first apical cell longer than the second, but not inordinately so. *Posterior wings* hyaline, whitish, slightly yellowish at the apex; veins pale yellowish; fifth apical cell scarcely reaching the anastomosis. (Pl. II. fig. 2.)

I have two males, taken at St. John's, Newfoundland, by Mr. G. F. Mathew. In the form of the wings the species approaches *S. dubius*, *punctatissimus*, &c.; but the first apical cell in the anterior wing is much shorter than in those species.

PLATYPHYLAX, nov. gen.

Characteres ut in *Stenophylaci* (sensu stricto), sed calcarium formula 1, 2, 2.

Agreeing in almost every respect with the typical forms of *Stenophylax* (e. g. *hieroglyphicus*, *striatus*, &c.), but with only 1, 2, 2 spurs instead of 1, 3, 4.

I form this genus for the reception of some insects that have been placed in *Enœcyla* on account of their spur-formula being identical (*i. e.* so far as the winged male of *Enœcyla* is concerned), but which are evidently very closely allied to *Stenophylax* and

should be placed next thereto. I have already (Stettiner entomologische Zeitung, 1867, p. 54) separated certain forms with the same number of spurs into a distinct genus under the term *Potamorites*; but these, in the narrower form, and pouched hind wings of the male, come near *Drusus*. *Platyphylax* is really so near *Stenophylax* that, without examining the spurs, the species might pardonably be supposed to pertain to the latter.

In *Platyphylax* should be placed the European *E. Frauenfeldii*, Brauer and *E. Kolenatii*, Kol. (=*Frauenfeldii* ♂?), the North-American *E. subfasciata*, Say, *E. designata*, Walker, and *E. lepida*, Hagen, and the Chinese species described below as *P. lanuginosus*.

E. irrorata, F. (=*intercisa*, Walk., Hag.), and *E. præterita*, Walk., probably form another genus. *E. areolata*, Walk., is probably a true *Enœcyla*; but it is desirable to see the female.

Platyphylax lanuginosus, nov. sp. *P.* fuscus, abdomine ochraceo. Antennæ palpique fusco-nigri. Pedes flavi, tibiis tarsisque fusconigris. Alæ anticæ latæ, testaceo-fuliginosæ, dense et breviter testaceo-hirsutæ; venæ pilis erectis fuscis fimbriatæ: posticæ fuliginoso-subhyalinæ, margine costali apicem versus flavido (♀).

Long. corp. 7 lin. (=15 mill.); exp. alar. 18 lin. (=37 mill.).

Hab. Shanghai (*in Mus. auct.*).

Head fuscous above, posterior margin and a small tubercle on each side close to the eyes testaceous; ocelli white; antennæ blackish, the basal joint with blackish hairs, a few testaceous ones being intermingled; face ochraceous; palpi blackish. *Thorax* fuscous above, ochraceous beneath; posterior half of metanotum yellowish. *Legs*: coxæ, trochanters, and femora testaceous; tibiæ and tarsi fuscous, armed with numerous short blackish spines. *Abdomen* ochraceous: at the apex are two short and obtuse appendices (my individual carries at the extremity of its abdomen a dried mass of gelatinous matter, such as envelopes the eggs).

Anterior wings broad, the apical margin oblique, somewhat sinuate, and narrowly darker; the colour is smoky with a testaceous tinge; and there is a uniformly dense, almost woolly clothing of short procumbent testaceous hairs, intermingled with which are short, erect, blackish hairs; and on the veins, especially on the cubitus, are longer, erect, blackish hairs: a white dot at the thyridium, and another at the arculus; veins pale fuscous; first to fourth apical cells all more or less truncate at the base, fifth acute, scarcely reaching the anastomosis, furnished with a short footstalk; a black horny dot at the base of the third apical cell. *Posterior wings* smoky subhyaline; veins blackish-fuscous; apical portion of costal margin, and the subcosta and radius at that portion yellowish.

I have one female, from Shanghai, taken by Mr. W. B. Pryer.

NEOPHYLAX, gen. nov.

Calcaria 1, 2, 4. Alæ anticæ densc pubescentes, apicem versus gradatim dilatatæ, margine apicali sinuato; cellula discoidali elongata: posticæ cellulis apicalibus 5 instructæ. Abdomen infra apicem versus dentibus duobus instructum (♂).

Head. Antennæ about the length of the wings, moderately short, the basal joint longer than the head. *Eyes* large. *Ocelli* present. *Maxillary palpi* with short and oval basal joint; second joint long, gradually thickened; third joint rather shorter than the second, cylindrical: labial palpi with two short and thick basal joints, and a longer, slender, and cylindrical terminal joint. *Thorax* short. *Abdomen* slender: penultimate and antepenultimate segments each furnished with a tooth beneath: appendices little prominent. *Legs* moderately long; tibiæ and tarsi with few spines: spurs 1, 2, 4; the inner subapical spur on the posterior tibiæ very small, scarcely more than a tooth-like tubercle; the other pairs subequal.

Anterior wings clothed with dense short pubescence, and with short fringes; narrow at the base, gradually widened to the apex; apical margin oblique, slightly emarginate in the middle of the margin of the fourth apical cell, elevated at the point of termination of upper branch of the fork of the ramus thyrifer, and afterwards gradually emarginate to the anal angle, which is rounded; discoidal cell very long and narrow, closed; apical cells long and narrow, the first, third, and fifth acute, or subacute, at the base, and longer than the second and fourth; radius strongly bent before its termination. *Posterior wings* broad, the fringes long at the anal angle; subcosta and radius running very close together for more than half their length, then becoming confluent, or nearly so, afterwards disuniting, the radius then curved; ramus subdiscoidalis simple; hence there are only five apical cells (three apical and two subapical, according to the nomenclature of Kolenati); discoidal cell broad, closed (♂).

A singular genus, which should probably be placed near *Apatania*, with which it agrees in its spur-formula and densely pubescent anterior wings. The shape of the anterior wings is peculiar, and the neuration of the posterior wings very remarkable in the small number of apical cells, in this respect unique in the family Limnophilidæ.

NEOPHYLAX CONCINNUS, nov. sp. *N.* testaceus. Pedes nigro-spinosi. Alæ anticæ fulvæ, fusco-pubescentes, punctis albidis obsoletis irroratæ; margo dorsalis maculis tribus flavis ornatus; ciliis apicalibus fuscis, albido-interruptis; posticæ fumato-subhyalinæ.

Long. corp. $3\frac{1}{2}$ lin. (=7 mill.); exp. alar. $9\frac{1}{2}$ lin. (=20 mill.).

Hab. America boreali (*in Mus. auct.*).

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seen to be dilated at the base, then with the upper margin excised to the apex, which is obtuse; app. inf. inserted close together on the ventral margin, band-like, curved strongly inwards, forming a deep incision when viewed from beneath, the apex obtuse.

Anterior wings fulvous, thickly clothed with short, procumbent, fuscous pubescence, the apical half irrorated with many small and indistinct whitish dots; inner margin with three yellow spots, viz. an elongate one at the base, a long triangular one about the middle, and a small one before the anal angle; the pubescence in the spaces between these spots is darker, almost blackish fuscous; apical fringe alternately fuscous and whitish; veins testaceous, the costal margin at the base, and the basal portion of the radius, ciliated with fuscous. *Posterior wings* subhyaline, slightly smoky; the fringes at the anal angle very long, silky, and whitish. (Pl. II. fig. 3, details.)

I received one male example from Mr. J. Angus, of the State of New York.

Fam. SERICOSTOMATIDÆ.

NOTIDOBIA, *Stephens*.

NOTIDOBIA GRISEOLA, nov. sp. *N.* nigro-fusca. Caput prothoraxque cinereo-hirsuta: antennæ palpique fusci. Pedes flavescentes, antici omnino, femoribusque intermediis posterioribusque interdum fuscis. Abdomen fuscum, cinereo-hirsutum, linea utrinque pallida: appendices inferiores ♂ magnæ, truncatæ, supra in dentem uncinatum incurvatum intus productæ. Alæ anticæ griseæ, dense cinereo-pubescentes: posticæ pallidiores (♂, ♀).

Long. corp. ♂ 2½ lin. (=6 mill.), ♀ 2¾–4 lin. (=6¼–8½ mill.); exp. alar. 9–12½ lin. (=19–26¼ mill.).

Hab. California (*in Mus. auct.*).

Blackish fuscous. *Head* and *prothorax* clothed with whitish ashy-grey hairs, changing to fuscous on the face; antennæ fuscous, paler and

fig. 5.)

Anterior and *posterior wings* uniformly fuliginous, subdiaphanous, clothed, but not densely, with short brownish pubescence, which becomes somewhat golden on the costal margin of the anterior wings; and in these wings the pterostigma is indicated by a narrow yellow space; fringes brownish-grey, becoming pale grey towards the anal angle of the posterior; veins fuscous.

I have one male, from California, sent by Mr. Henry Edwards. It differs from *N. griseola* by the uniform smoky colour of the wings, and in the form of the appendices.

NOSOPUS, gen. nov.

Calcaria 1, 4, 4. Antennarum articulus basalis elongatus, hirsutus. Palpi maxillares parvi, ad frontem arcte applicati: labiales valde elongati, compresso-dilatati, squamati; articulo basali parvo, 2° elongato, dilatato, 3° ad apicem acuminato. Pedes antici tibia brevissima calcare singulo uncinato instructa, tarsorum articulus basalis valde dilatatus, intus sulcatus, infra dense cerato-squamatus: intermedii posticique graciles. Alæ anticæ ovales, hirsutæ; cellula discoidali occlusa, angustata, cellula thyridii perelongata; cellulis septem apicalibus: posticæ in medio dilatatæ; cellula discoidali parva, occlusa (♂).

Head densely clothed with long hairs; antennæ not so long as the wings, moderately stout, the apical half subserrate internally, basal joint nearly twice the length of the head, strong, hirsute, the succeeding joints short and transverse; eyes small and round; maxillary palpi very small, somewhat clavate, directed upwards and lying closely applied against the face, clothed externally with long and strong hairs; labial palpi very large and long, densely clothed with scales, the basal joint short, second very long, compressed and dilated, third about as long as the second, and equally broad at the base, but gradually acuminate to the apex. *Legs*: anterior pair abnormally constructed as follows:—the coxa elongate, and ordinary; the trochanter small and cup-shaped; femur long, moderately slender, gradually diminishing from base to apex; tibia very short, sub-

ovate, truncate, and dilated, slightly scaly, armed with one stout, claw-shaped spur; first joint of tarsi enormously dilated, twice the length of the tibia, sulcate internally, the lower surface densely furnished with waxy-looking scales; succeeding tarsal joints short and small, gradually diminishing in length and thickness; intermediate and posterior legs slender, and of the ordinary form, each tibia furnished with an apical and subapical pair of long and equal spurs. *Abdomen* short and somewhat stout; inferior appendices short, curved.

Anterior wings oval, rather densely clothed with short hairs, the fringes somewhat long; subcosta and radius nearly straight, parallel; discoidal cell narrow, closed by a straight veinlet; cellula thyridii very long, extending nearly to the base, and reaching to the middle of the discoidal cell, closed by a straight veinlet; a veinlet unites the lower fork of the ramus discoidalis with the ramus thyrifer, placed level with that closing the discoidal cell; an oblique veinlet beneath the middle of the cellula thyridii unites this with the cubitus anticus; seven apical cellules, the first extending along one-third of the upper edge of the discoidal cell, third shorter than the first, but longer than the second, fourth equal to the second, fifth longer than the first, extending to a level with the middle of the discoidal cell. *Posterior wings* moderately long, gradually dilated to beyond the middle, apex parabolic, costal margin with a short inturned fringe, anal portion with very long fringes; subcosta and radius united for some distance, afterwards separating and diverging; discoidal cell small, subtriangular, closed by a straight veinlet; a second veinlet unites the lower edge of the discoidal cell to the ramus subdiscoidalis; lower branch of the ramus discoidalis simple; ramus subdiscoidalis simply and longly furcate.

A genus abundantly distinct by the enormous labial palpi, and very abnormal structure of the anterior legs, the aborted tibia and enormous first tarsal joint in these legs being very remarkable; the mass of scales on the surface of this strange tarsal joint has, at first sight, the appearance of a waxy secretion, but resolves itself into waxy-looking scales under a high power. The genus is evidently a near ally of *Mormonia*; and nature would seem to have selected this group as one in which she can best display her wealth of forms. In this group is also exhibited a more or less constant tendency to substitute a scale-like clothing for hairs in the male sex. In the typical species of *Mormonia* (*M. hirta*) this clothing pervades almost the entire insect; in *Nosopus* it is concentrated, so to speak, upon the labial palpi and the abnormal tarsal joint. It is possible, nay, almost certain,

that the female will be found to have ordinary palpi, and the usual slender anterior legs; and, in all probability, 2, 4, 4 spurs; for one spur may be reasonably supposed to be aborted in the anterior male tibiæ.

Nosopus podager, nov. sp. *N. fuscus.* Caput griseo-hirsutum. Antennæ flavidæ, fusco-annulatæ, articulo basali supra griseo, infra nigro-hirsuto. Palpi maxillares nigro-hirsuti; labiales rufo-squamati. Pedes antici rufo-fusci, tarsorum articulo 1° infra rufo-squamato: intermedii posticique testacei. Abdomen fuscum. Alæ griseo-fuscæ, subhyalinæ, griseo-hirsutæ: anticæ ad costam marginisque interioris basin breviter nigro-fimbriatæ (♂).

Long. corp. 3 lin. (=6 mill.); exp. alar. 9 lin. (=19 mill.).

Hab. California (*in Mus. auct.*).

Dark fuscous. *Head* above, and basal joint of antennæ, clothed with grey hairs, face and maxillary palpi with black hairs; antennæ (except the basal joint) yellowish, with narrow fuscous rings; labial palpi densely clothed with reddish scales. Anterior *legs* reddish fuscous, the lower and outer side of the first tarsal joint with dense waxy-looking reddish scales; intermediate and posterior legs testaceous, the coxæ fuscous. *Abdomen* fuscous, the margins of the segments greyish: from beneath the upper margin of the last dorsal segment proceeds a short, broad lobe, which ends in two updirected triangular pointed branches; app. inf. short, band-like, curved inwards, the apex toothed.

Wings greyish-fuscous, sparingly clothed with dark grey hairs: in the anterior wings the pterostigmatical region with denser hairs; apical fringes grey; costal margin, and inner margin at the base, with short blackish fringes: posterior wings with grey fringes, becoming blackish at the base of the costa: veins pale grey in all the wings. (Pl. II. fig. 6, details.)

I have one male, sent by Mr. H. Edwards.

Dinarthrum, gen. nov.

Calcaria 2, 4, 4. Antennarum articulus basalis rectus, longissimus, corporis longitudini æqualis, irregulariter compressus, utrinque fimbriis longis, necnon ad basin spina robusta instructus; articuli cæteri breves, graciles, basalis semel sumpti longitudinem haud superantes. Palpi maxillares elongati, porrecti, plumosi, 2-articulati; articulo 1° modice robusto, 2° gracili, curvato: labiales pergraciles, elongati; articulo 1° brevissimo, 2° elongato recto, 3° 2° æquali, curvato. Pedes graciles. Alæ anticæ ovales, squamatæ hirsutæque, sulco longitudinali elongato angustato mediano instructæ; mar-

to *Lasiocephala*, with which it has some affinity in the maxillary palpi; but the extraordinary form of the antennæ is without parallel anywhere in the Trichoptera. In *Nosopus* the anterior legs were the members in the construction of which nature had departed from her usual routine; here the legs present no special characters, but every thing is thrown into the development of the antennæ, with a result which, to say the least, is bizarre. The groove or pouch of the anterior wings is not of so great significance, as modifications of this already exist in many genera, and where such a groove is present, it often, as in the present instance, causes irregularity in the neural arrangement.

The female will probably be found to have ordinary antennæ, and to resemble that of *Mormonia*.

Dinarthrum ferox, sp. nov. *D.* fusco-testaceum. Antennarum articulus basalis fuscus, fimbria grisea, ad apicem flavescente; articuli cæteri pallide flavi, fusco-cingulati. Palpi flavi, maxillares griseo-hirsuti nigroque squamati. Pedes pallide flavi. Abdomen supra fuscescens, infra ochraceum: appendices inferiores ad apicem longe dentatæ. Alæ pallide griseæ, griseo-fimbriatæ, nigroque squamatæ: anticæ margine costali basin versus sulcoque nigro-fimbriatis (♂).

Long. antenn. artic. primi $2\frac{3}{4}$ lin. (=6 mill.); long. corp. $2\frac{3}{4}$ lin. (=6 mill.); exp. alar. 10 lin. (=21 mill.).

Hab. in India septentrionali (*in Mus. auct.*).

Fuscous, or yellowish-fuscous, all the under parts of the thorax yellow. *Head* fuscous above, yellow beneath, clothed with greyish fuscous hairs: basal joint of antennæ fuscous, becoming yellowish towards the apex, the basal portion of the tooth almost black and somewhat shining, fringes dark grey, blackish at the basal portion, and yellowish at the apical; rest of the antennæ pale yellow, with brown rings: maxillary palpi yellow, clothed with long dark grey or blackish hairs, intermingled with a few black scales; labial palpi pale yellow. *Legs* yellow, with yellow spurs. *Abdomen* somewhat fuscous above, the margins of the segments broadly darker, under surface ochraceous: the margin of the last dorsal segment is produced into a triangular prolongation in the middle; from beneath this prolongation proceeds a yellow, shining, triangular lamina, which is deeply grooved in the centre, the sides sloping obliquely upwards, having the appearance of two valves soldered together; app. sup. yellow, short and broad, subquadrate, proceeding from beneath each side of the prolongation of the last dorsal segment; app. inf. long, yellow, directed upwards, the apex furnished with two long spines or teeth, each of which is as long as the simple basal portion, the appendices are hairy; interiorly, viewed from beneath, between the app. inf. are

seen two small yellow appendices, which are probably the app. intermed.

Wings pale grey, with long grey fringes. *Anterior wings* clothed with golden-grey hairs, the upper portion (above the groove) with numerous, slightly attached, black scales; these scales are absent in the lower portion; costal margin with a strong inturned fringe of blackish scale-like hairs at the base, and a fringe of similar hairs on the ramus clavalis closing over the groove; veins yellow, especially those in the lower portion, the apical ones fuscescent. *Posterior wings* clothed with grey hairs, and with scattered black scales on the anterior margin; veins fuscous. (Pl. II. fig. 7, details.)

I have two males of this extraordinary creature, which were given to me by Capt. A. M. Lang, R.E., by whom they were captured in North India.

Fam. LEPTOCERIDÆ.

PERISSONEURA, gen. nov.

Calcaria 2, 4, 4, pubescentia. Caput transversum, inter oculos excavatum; ocelli desunt: antennæ graciles, articulo basali bulboso: palpi maxillares elongati, hirsuti, articulo basali brevi, cæteris elongatis inter se longitudine fere æqualibus: labiales parvi. Thorax robustus. Pedes graciles. Abdomen robustum. Alæ amplæ, latæ, ad apicem obtusæ, pubescentes; venis robustis: anticarum radio cum sectore apicali 1° juncto, venulis transversalibus in area costali plurimis, quarum una furcata; anastomosis ante medium sita; cellula discoidali elongata, occlusa, ante apicem venula transversa insititia instructa; cellulis apicalibus decem, elongatis: posticæ anticis haud latiores (♀).

Head transverse, polished, excavated between the antennæ; no ocelli; eyes moderately prominent; antennæ not longer(?) than the wings, slender, the basal joint bulbous; maxillary palpi long, hairy, ascending, basal joint very short, second and third joints long, equal, cylindrical, stout, fourth and fifth slightly shorter and thinner, the latter obtuse at the apex; labial palpi small, hairy, first joint very short, second and third longer, equal. *Prothorax* small and transverse, hairy. *Mesothorax* robust, convex above, polished. *Legs* slender, pubescent; spurs 2, 4, 4, pubescent; anterior tibiæ with a pair of moderately long and subequal spurs; intermediate and posterior tibiæ each with two pairs of long and subequal spurs. *Abdomen* very stout, long; the apex beneath forms a polished, flattened surface, on which is seen an oval scale on each side of the vulva, and beyond these two acute valves.

Wings broad, clothed wit
veins very strong and m
at the apex, which is ol
the inner margin very c
costal margin; radius p
first apical sector near t
transverse veinlet; cost
by a broadly furcate vei
all strong and well mark
the radius by a veinlet;
rowed after the points of
verse veinlet at about the
beyond, at the point of furcation of the lower branch of the ramus discoidalis; cellula thyridii very long, extending nearly to the base, gradually dilated to the point where it is closed by a transverse veinlet; anastomosis complete, situated before the middle of the wing; apical cells ten in number, very long, the fifth and seventh not reaching the anastomosis, and acute at the base. *Posterior wings* scarcely so broad as the apical
apical and inner margins gently
rowly inwards for the greater pa
separated only at the base an
in the anterior, similarly formed,
veinlet; forks one, two, three,
rous; cubitus furnished with a fringe of strong oblique hairs, which lie close to the membrane beneath it: marginal fringes scarcely present in either pair of wings (♀).

In no other genus am I aware of the existence of the numerous strong costal veinlets here present. It is true that the species of the anomalous family Œstropsidæ (*Polymorphanisus* &c.) present an analogous character; but in them these veinlets are ill-developed, and have been aptly termed by Brauer, the founder of the family, "false veinlets." Neither am I aware of the existence of a supplementary veinlet in the discoidal cell in other genera. Although I place the genus in the Leptoceridæ, I am by no means sure of its position, which can only be decided by the discovery of the male. In fact, several points of structure rather indicate that its true location would be in the Sericostomatidæ, in the vicinity of *Barypenthus* and *Musarna*. The form of the maxillary palpi of the female is not inconsistent with its position in either Leptoceridæ or Sericostomatidæ.

PERISSONEURA PARADOXA, n. sp. *P.* atra, capite thoraceque nitidis. Pedes picei, genibus calcaribusque testaceis. Abdomen sor-

arise tufts of long hairs: ocelli absent: antennæ very long and slender, but sometimes gradually thickening to the apex; basal joint short, succeeding joints (after the second) long, but those of the apex becoming gradually shorter and almost transverse: maxillary palpi ascending, the joints band-shaped and very hairy; first joint short, third very long, second, fourth, and fifth each shorter than the third, but the second longer than the fourth or fifth: labial palpi very small and slender, the two end joints elongate. *Mesothorax* very robust, long-oval, nude, but with a tubercle near the point of connexion of each anterior wing, whence arise long hairs similar to those on the vertex. *Abdomen* short, very robust in the ♀. *Legs* slender, pilose; spurs 2, 4, 4, the pairs subequal.

Wings nearly nude and shining, the veins very conspicuous and strong, alike in both sexes. *Anterior wings* elongate, dilated towards the apex, which is considerably produced; apical margin very oblique; inner margin concave; radius becoming confluent with the first apical sector a little before the apex, but sending a short branch to the costal margin; discoidal cell closed, short, elongately triangular, no veinlet between this cell and the radius; cellula mediana longer than the discoidal, equal to it at its extremity, but extending further inwards at its base; cellula thyridii very broad, commencing near the base, but not extending to the middle of the wing (ending before the commencement of the discoidal cell), hence the sixth to ninth apical cells extend far into the wing; all the apical cells narrow and very long. *Posterior wings* elongately oval, much shorter than the anterior wings, and scarcely broader: radius confluent with the first sector, as in the anterior, and the subcosta also appears to be confluent with the radius at its apex; the cubitus is furnished with a fringe of long hairs towards the base, and the veins of the anal angle are similarly fringed.

The appendices of the male are complicated: the app. sup. rather long, narrow at the base, but gradually dilating into a spoon-shaped club: the app. inf. two-jointed, the apical joint being short and ovate; between the app. sup. are two large blades, nearly uniting in the middle, but with the obtuse points divergent; and between and below these there is the penis, only the apex of which is visible. In the female the extremity of the abdomen is broad, forming a large open pouch with two broad side valves and a median prolongation of the last dorsal segment: the apical ventral segments are narrow and transverse.

The figures on Pl. III. (fig. 9) are taken from *A. finitimus*, M'Lachlan. The original species, *A. humeralis*, Walker, is larger and darker, and, with the appendices somewhat different, though

arises the long, triangular, yellow penis (or perhaps it is rather only the penis-cover), the apex of which is somewhat produced and notched, this member is concave beneath, and extends beyond the appendices.

Anterior wings varying from dark golden brown to blackish fuscous, uniformly of one tint without markings (the ♀ always the darker), clothed with golden or fuscous pubescence (when the pubescence is removed, the membrane appears to be sprinkled with somewhat numerous, but indistinct, pale dots); fringes fuscous; veins brown, costa, subcosta, and radius darker, because thicker; upper branch of the ramus thyrifer, in that portion of it that forms the upper boundary of the cellula thyridii, whitish, semitransparent. *Posterior wings* smoky blackish, the veins darker; fringes blackish. (Pl. III. fig. 10, details.)

I have examined six males and two females, sent to me by Mr. Henry Edwards, of San Francisco.

GANONEMA, *M'Lachlan* (Tr. Ent. Soc. Lond. ser. 3, vol. v. p. 253).

In this genus should be placed *Hydropsycha vicaria*, Walker, Cat. Brit. Mus. Neurop, pt. 1, p. 114, from Venezuela, the type of which is a single unexpanded example with broken antennæ. I have received a second individual from the same quarter, from which I have drawn up the following description. A second species is also from Venezuela. These do not differ sufficiently in structure from the Malayan *G. pallicorne* to necessitate the formation of a genus for their reception, notwithstanding the wide difference in locality. I still think that the suspicion expressed by me (*l. c.* p. 255), that *Asotocerus* and *Ganonema* may be identical, is well-founded, especially as the neural differences in the fore wings are more apparent than real, inasmuch as the lower branch of the ramus discoidalis is really only simply furcate in *G. pallicorne*, the supposed additional sector belonging to the ramus thyrifer; hence there are the same number of sectors in both genera. The neuration of the hind wings of both the Venezuelan species is like that in *Asotocerus*, both being males; thus it is very probable that the differences are sexual, as I suspected. In the form of the wings the South-American species agree with *Ganonema* *.

* A very closely allied genus is *Calamoceras*, Brauer, as would seem to have been since recognized by its describer (Verh. Zool. Bot. Gesell. Wien, 1868, p. 406). I cannot help thinking that the locality, "Gibraltar," given for *C. marsupus*, has arisen from an error in labelling, and that the insect is really exotic.

Ganonema vicarium. (Hydropsyche vicaria, *Walk. l. c.*) *G.* ferrugineum, mesothoracis lateribus nigricantibus. Antennæ flavæ, nigro-annulatæ, articulis singulatim spina brevi intus ad apicem instructis. Pedes flavi, tibiis tarsisque intermediis extus obscurioribus. Alæ anticæ griseo-fulvæ, nigro-pubescentes et fimbriatæ, maculis aureis plurimis indistincte irroratæ; margine apicali obliquo, paullo rotundato; cellula apicali 1ª anastomosim attingente: posticæ griseo-subhyalinæ, griseo-fimbriatæ (♂).

Long. corp. 4 lin. (=9 mill.); long. antenn. 15 lin.(=32 mill.); exp. alar. 12–13 lin. (=25–27 mill.).

Hab. Venezuela (*Dyson*; *Göring*; *in Mus. Brit. et auct.*).

Ferruginous (or reddish-testaceous). *Head* clothed with scattered yellowish hairs upon the vertex, and with a few distant black hairs at the margins of the orbits: antennæ yellow; each joint, after the basal, conspicuously black in its apical half, the apex of each bearing a short black spine internally (in the last third the annulations become indistinct and brownish, and finally disappear): eyes coppery: maxillary palpi yellow, clothed with long black hairs, intermingled with some yellowish ones: labial palpi with yellow hairs. *Mesonotum* bearing a broad black stripe along each side. *Legs* yellow, with yellow pubescence; but the intermediate tibiæ and tarsi are rendered blackish externally owing to the presence of sparse blackish pubescence. *Abdomen* yellowish, the apex obscure: app. sup. long, flattened, somewhat lanceolate, yellowish, the points approximating; app. inf. long, thinner than the app. sup., directed upward, with a tuft of blackish hairs at the tips; between the app. inf. is seen the short, thick, yellow penis (or cover?). (Pl. III. fig. 11.)

Anterior wings obliquely rounded at the apical margin; grey or greyish-fulvous, densely clothed with blackish pubescence, especially at the apical portion, and with numerous but ill-defined spots formed by golden-yellow pubescence; apical fringe short, blackish, golden at the extreme base; first apical cellule reaching the anastomosis, as long as the third, impinging only slightly upon the discoidal cell. *Posterior wings* pale grey, subhyaline, iridescent; fringes grey; veins brownish.

The pubescence of the anterior wings is only lightly attached; the golden markings are more conspicuous when the wings are closed.

Ganonema molliculum, n. sp. *G.* flavo-testaceum. Antennæ flavæ, brunneo-annulatæ. Pedes flavi. Alæ anticæ subhyalinæ, aureo-pubescentes, brunnescenti-fimbriatæ; margine apicali oblique truncato; cellula apicali 1ª petiolata: posticæ albido-subhyalinæ, albido-fimbriatæ (♂).

Long. corp. 3½ lin. (=7 mill.); long. antenn. 16 lin. (=34 mill.); exp. alar. 12 lin. (=25 mill.).

Hab. Venezuela (*Göring*), in *Mus. auct.*

Testaceous yellow. *Head* and palpi clothed with yellowish hairs; antennæ pale yellow, the apical half of each joint pale brownish, not toothed internally. *Legs* yellow, with yellow pubescence. *Abdomen* pale yellow: app. sup. flat, lanceolate, pale yellow, with long concolorous fringes; app. inf. two-jointed, yellow, the first joint somewhat swollen, the second ovate, shorter, turned slightly inwards, the extreme tip reddish-testaceous; between and beneath the app. inf. is the short broad penis (or cover?), which is deeply concave beneath and blackish internally, the margins thickened. (Pl. III. fig. 12.)

Anterior wings subhyaline, clothed with golden pubescence, which is thin in the basal portion, but becomes denser and slightly brownish in the apical; apical fringe pale brown; apical margin obliquely truncate; veins very pale yellowish; first apical cellule not reaching the anastomosis, petiolate and acute. *Posterior wings* whitish, subhyaline, the pubescence with a slight yellowish tinge; fringes very pale yellowish or whitish; veins pale.

Note on Genus Pseudonema, *M'Lachlan.*

With a view to testing the value of Brauer's suspicions ('Reise der Novara,' Neuropteren, p. 14) that *P. obsoletum*, described by me in 1862, might probably be the same as *Tetracentron sarothropus*, Brauer, I have lately made a reexamination of the type in Mr. Dale's collection. There can be no doubt of the identity of my species with that of Brauer, the generic description of *Pseudonema* being faulty, in consequence of the type having been mutilated. This is one of those cases in which the older name may very justly be forced to give way to a later one: henceforward I consider *P. obsoletum* merely a synonym of *T. sarothropus*. Priority in nomenclature should, no doubt, be a rule absolute, as the only means of avoiding constant alterations depending upon what is a "correct description," as defined by individual caprice; but, as there is no rule without an exception, I think that when an author, as in my case, willingly discards a name given by him, succeeding writers should accede to his expressed wishes.

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Anterior wings long and narrow, gradually dilated to before the apex, which is subelliptical, nearly nude, and shining, pale straw-yellow, with numerous pale fuscous markings, as follows:—rather beyond the middle are two fasciæ commencing together on the costa, but then running obliquely into the inner margin in different directions, leaving a broad triangular space between them, in which is a line and one or two points; the apex broadly fuscous, ending in a narrow transverse curved line of the pale ground-colour; the basal portion of the wing before the first fascia is occupied by numerous short transverse streaks and points, and then several similar streaks between the second fascia and the apical portion; pterostigma indicated by a subopaque space clothed with short yellow pubescence; veins pale yellow. *Posterior wings* whitish hyaline, the costa abruptly excised before the apex; extreme apex rather broadly margined with pale grey; veins greyish-white, more obscure at the apex; fringe of the anal margin whitish. (Pl. III. fig. 14.)

I possess about nine male examples, sent to me by Mr. Ridings, of Philadelphia, with other North-American insects, but without any special indication of locality. Possibly the nearest ally of the species is the Brazilian *M. maculatum* of Perty (Delect Anim.). It is a strikingly elegant form.

anticæ angustatæ, pallide flavidescentes, haud signatæ: posticæ griseescentes, subbyalinæ (♂).

Long. corp. 2½ lin. (=

Hab. Australia (Victor

Fuscous. *Head, proth*
densely clothed with
lated with brown:
on each of the troch
margin of last dorsal
from beneath this seg
app. inf. testaceous;
dually clavate at its
slightly curved: pen
unarmed. (Pl. IV. fig. 15.)

Anterior wings narrow, pale yellow, without markings; veins testaceous. *Posterior wings* greyish subhyaline, the costal edge testaceous; veins fusco-testaceous.

I possess a male of this moderately small pale species, which presents no particular structural peculiarities, save that the second joint of the app. inf. is more spiniform than is usual.

STENOPSYCHE, *M'Lachlan.*

When I described this genus (Tr. Ent. Soc. Lond. ser. 3, vol. v p. 264) I was acquainted with the ♂ only. I now possess also the ♀, which differs only in its larger size and dilated joints of the intermediate tarsi; the apex of the abdomen is produced, and there are two rather long narrow valves.

STENOPSYCHE GRISEIPENNIS, M'Lachlan.

The ♀, from Assam, in my collection measures 25 lines (=52 mill.) in expanse of wings. In coloration it is similar to the ♂, save that the inner margin of the anterior wings has a broad whitish streak extending from the base to the anal angle.

A second ♂, from the "Snowy Valley," near Ningpo, China (*Mr. Pryer*), resembles the Indian type; but the grey reticulated markings of the anterior wings are more delicate and uniform, not united into blotches, the posterior wings less opaque.

SMICRIDEA, nov. gen.

Calcaria 1, 4, 4. Frons valida. Antennæ graciles, breves; articulo basali vix dilatato, perbrevi. Ocelli desunt. Palpi

fuscous spots, not very distinct, placed on the transverse nervules and at the furcations, and these nervules appear to be slightly raised; about these spots is some pale clouding; before the apex a broad, but not conspicuous, transverse fascia caused by pale yellowish-white pubescence; the veins fuscous; the subcosta extending far beyond the middle of the costa; the median cellule commencing far before the discoidal, but not reaching to its end. *Posterior wings* pale grey, with grey pubescence and fringes (in these wings I am unable to define the exact course of the subcosta or the position of the veinlet closing the discoidal cell, and have, therefore, indicated them by dotted lines in the figure, Pl. IV. fig. 21, details).

I have one ♂ and one ♀ of this species.

Tinodes, *Leach*.

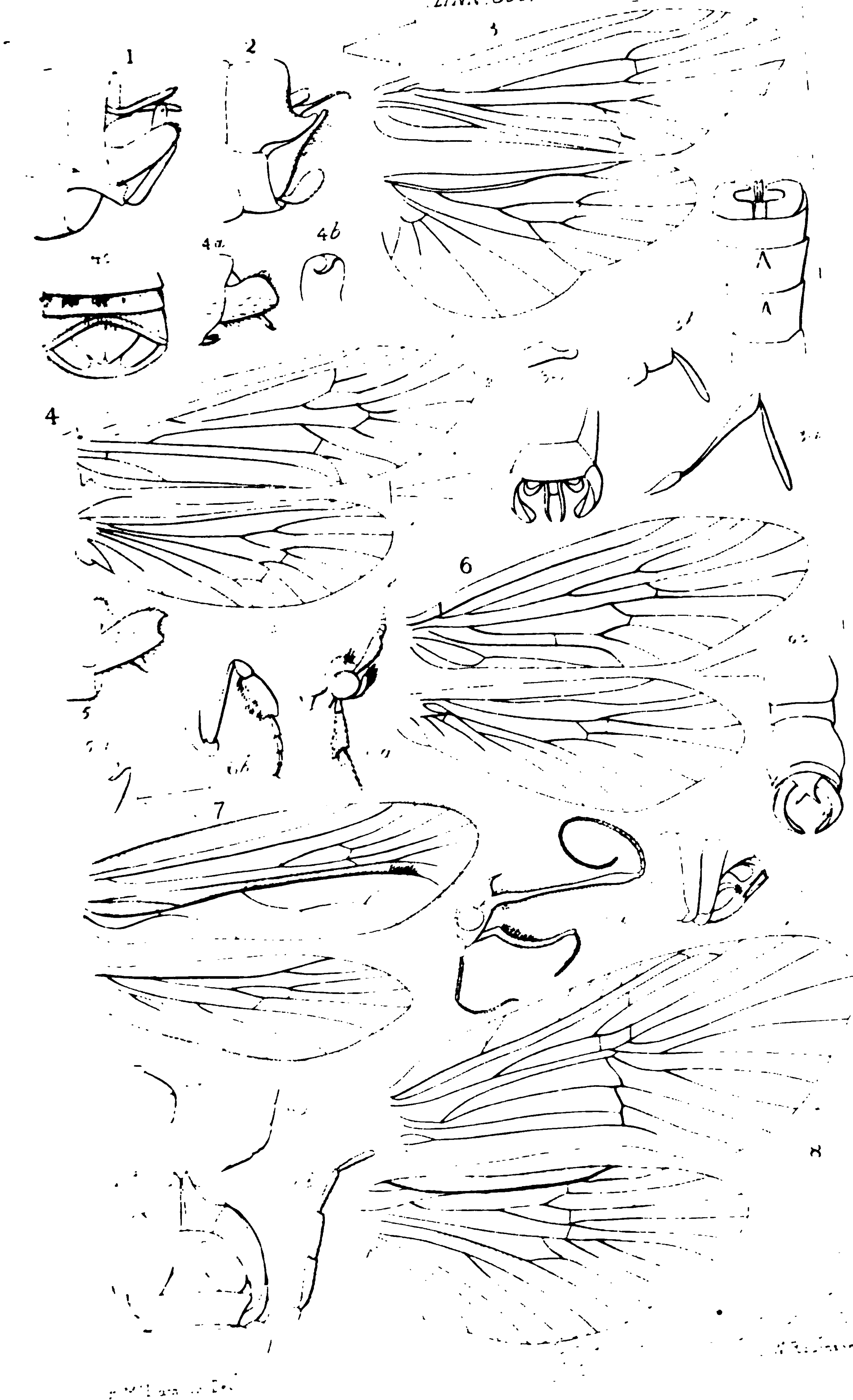
Tinodes consueta, sp. nov. *T.* **fusca, aureo-pilosa. Pedes pallide flavi, coxis, femoribusque anticis intus, fuscis. Abdomen fusco-testaceum; appendicibus superioribus linearibus paullo curvatis, inferioribus ad basin marginis, supra processu elongato curvato, infra spinula instructis; lobo superiore mediano magno, triangulari, supra carinato. Alæ anticæ flavo-fuscæ, dense aureo-pubescentes: posticæ infumatæ, subhyalinæ (♂).**

Long. corp. 2½ lin. (=5 mill.); exp. alar. 7½ lin. (=15 mill.).

***Hab.* California (*in mus. auct.*).**

Blackish fuscous. *Head* and *thorax* clothed with pale golden hairs; eyes greyish yellow in their upper portion, blackish in the lower; antennæ fuscous, somewhat ochreous, more or less annulated with paler; palpi fuscous. *Legs* pale yellow; the coxæ, the anterior femora beneath, and sometimes the other femora (also beneath) fuscous. *Abdomen* fuscous, more or less testaceous or ochreous (colour probably altered), appendices pale; app. sup. long, scarcely curved, hairy, and linear; app. inf. two-jointed, the basal joint forming a broad base, excised above, and the lower angle produced into a short curved spine, the second joint forming a curved finger-shaped appendage arising from the excision of the basal joint; above there is a very large, broadly triangular median lobe placed between the app. sup., the middle with a distinct elevated carina, the sides sloping downward. *Anterior wings* long, gradually widening from the base; the apex elliptical, dingy yellow, with dense golden-yellow pubescence, the naked circular space near the base scarcely evident; fringes golden grey; neuration arranged as is usual in *Tinodes*, greyish fuscous. *Posterior wings* greyish smoky, subhyaline, and with green reflections; fringes grey. (Pl. IV. fig. 22, details.)

I have four ♂, received from Mr. H. Edwards. It is a true *Tinodes* of quite the European type, the species being recogni-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4a
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zable by the broad triangular superior median lobe, which is carinated above. As a rule, the species of the genus, which are probably as numerous in North America as in Europe, can only be separated by the abdominal characters. *T.* (?) *livida*, Hagen (N. Amer. Neurop. p. 295), is unknown to me. I once saw the type of *T.* (?) *hirtipes*, Curtis, and noted that it was an *Apatania*, a genus belonging to another family.

Fam. RHYACOPHILIDÆ.

AGAPETUS, *Curtis*.

AGAPETUS CELATUS, n. sp. *A.* fuscus. Caput thoraxque flavo-hirsuti. Pedes fusci, femorum apicibus luteis; tibiis posterioribus griseo-fimbriatis (tibiis tarsisque intermediis ♀ valde dilatatis). Abdomen fuscum, segmento antepenultimo ventrali ♂ ♀ unidentato. Alæ anticæ nigricantes, brunneo-pilosæ, nigro-brunneo-fimbriatæ: posticæ nigro-fuliginosæ, micantes, griseo-fimbriatæ (♂ ♀).

Long. corp. 1⅓ lin. (=3½ mill.); exp. alar. 5⅓ lin. (=12 mill.).

Hab California (*in mus. auct.*).

Blackish-fuscous. *Head* and *prothorax* clothed with golden or yellow hairs; ocelli whitish yellow; palpi and antennæ blackish-fuscous. *Legs* fuscous, trochanters and tips of the femora yellowish; in the ♂ the posterior tibiæ are fringed with long grey hairs; in the ♀ the intermediate tibiæ and first tarsal joint are strongly dilated, concave internally, and fringed with grey hairs. *Abdomen* fuscous; in the middle of the antepenultimate ventral segment in the ♂ is an obtusely triangular short tooth, not extending beyond the margin of the segment, and a somewhat similar, but shorter and broader, tooth is also seen in the ♀; there is no tooth or tuft of hairs on the penultimate segment: in the ♂ the app. inf. are elongately triangular, curved inwards at the tips, rather widely separated when viewed from beneath, fringed with yellow hairs externally; when viewed from beneath there is an appearance of two small points projecting from the inner side of the app. inf. close to their tips; these are probably the apices of the penis-sheaths, and not connected with the app. inf.; the penis-cover seems to consist of one large piece placed above the app. inf. and nearly reaching their tips (these anal parts are so strongly applied one against the other in the dry example, that it is impossible to describe them with certainty); in the ♀ the abdomen ends in a slender ovipositor, which is curved downwards.

Anterior wings uniformly blackish, somewhat shining, with a moderately dense clothing of short brownish pubescence and long blackish fringes; veins blackish. *Posterior wings* blackish, subhyaline, and with

purple reflections; fringes long and grey; veins blackish. (Pl. IV, fig. 23, details.)

I have one ♂ and two ♀ from California, sent by Mr. Henry Edwards. The insect is a true *Agapetus* in every respect. The species of this genus are all small and obscure, and can only be separated by the forms of the ventral tooth or teeth, and of the appendices of the male; and even then, to ensure certainty, it is advisable always to examine living specimens when that is possible.

EXPLANATION OF THE PLATES.

Plate II.

Fig. 1. *Grammataulius brevilinea*, M'Lach., ♀, appendices, from side.

2. *Stenophylax limbatus*, M'Lach., ♂, appendices, from side.

3. *Neophylax concinnus*, M'Lach., ♂, neuration of wings; 3 *a*, maxillary palpus; 3 *b*, labial palpus; 3 *c*, appendices, from above; 3 *d*, extremity of abdomen and appendices, from beneath; 3 *e*, app. intermed., more enlarged.

4. *Notidobia griseola*, M'Lach., ♂, neuration of wings; 4 *a*, appendices, from side; 4 *b*, app. inf., seen internally, more enlarged; 4 *c*, ♀, extremity of abdomen, from above.

5. *Notidobia nigricula*, M'Lach., ♂, appendices from side; 5 *a*, app. inf., seen internally, more enlarged.

6. *Nosopus podager*, M'Lach., ♂, neuration of wings; 6 *a*, head; 6 *b*, anterior leg; 6 *c*, appendices, from above.

7. *Dinarthrum ferox*, M'Lach., ♂, neuration of wings; 7 *a*, head; 7 *b*, appendices, from side.

8. *Perissoneura paradoxa*, M'Lach., ♀, neuration of wings; 8 *a*, basal portion of antenna; 8 *b*, maxillary palpus; 8 *c*, labial palpus; 8 *d*, extremity of abdomen, from beneath.

Plate III.

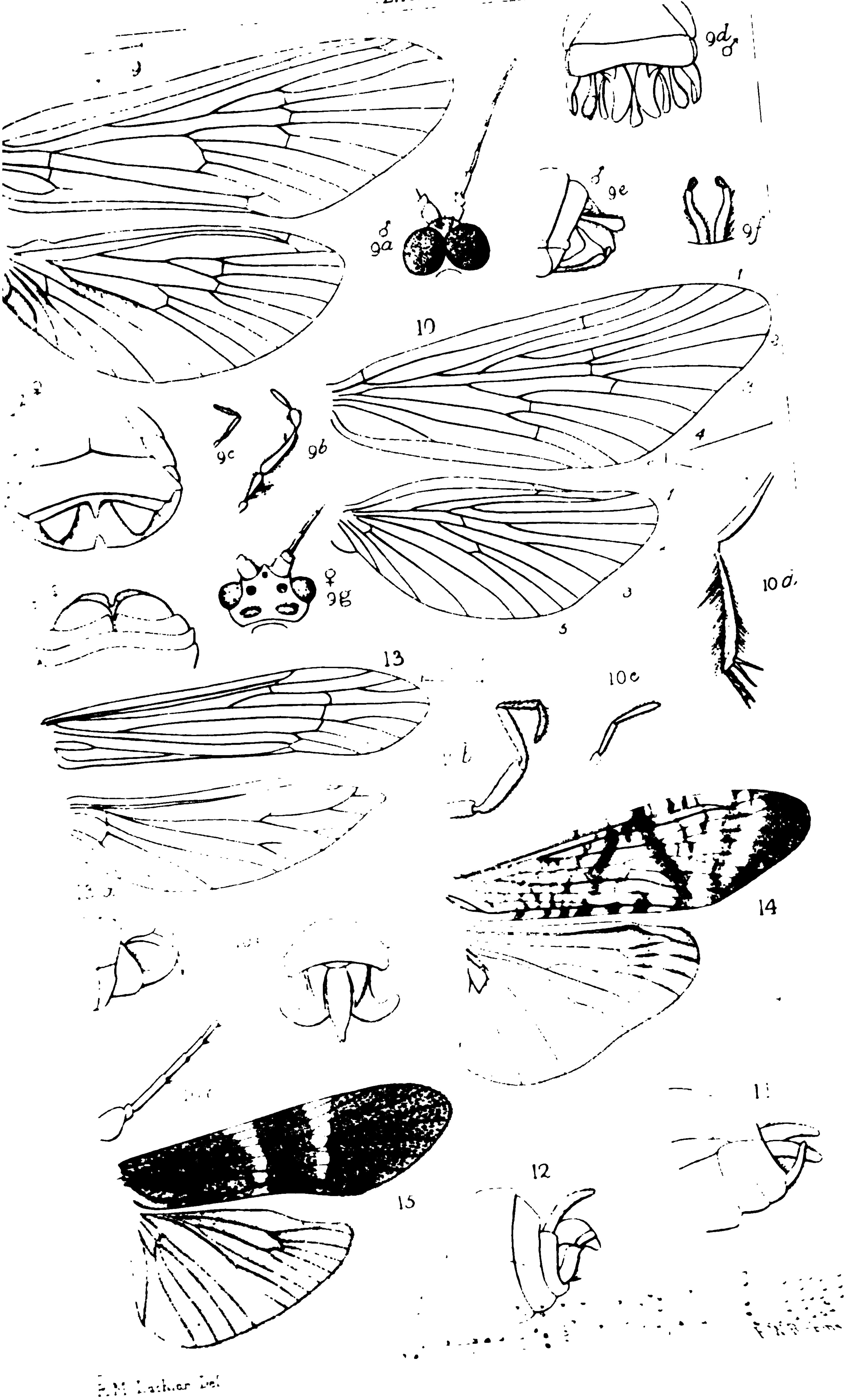
Fig. 9. *Ascalaphomerus finitimus*, M'Lach., ♂, neuration of wings; 9 *a*, head; 9 *b*, maxillary palpus; 9 *c*, labial palpus; 9 *d*, appendices, from above; 9 *e*, appendices, from side; 9 *f*, app. inf., from beneath, more enlarged; 9 *g*, ♀, head; 9 *h*, extremity of abdomen, from above; 9 *i*, the same, from beneath.

10. *Heteroplectron californicum*, M'Lach., ♂, neuration of wings; 10 *a*, basal portion of antenna; 10 *b*, maxillary palpus; 10 *c*, labial palpus; 10 *d*, posterior leg; 10 *e*, appendices, from above.

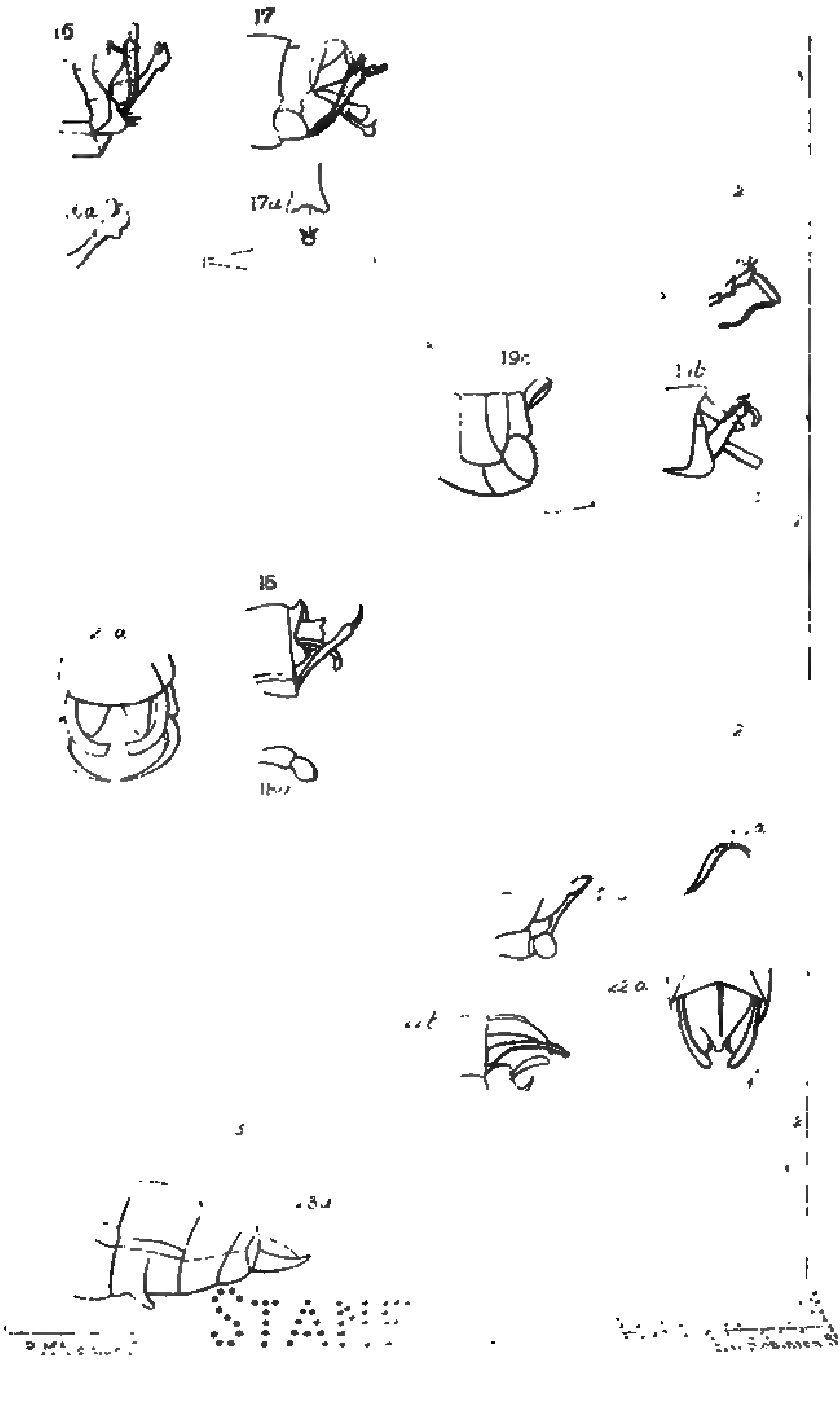
11. *Ganonema vicarium*, Walk., ♂, appendices, from side.

12. *Ganonema molliculum*, M'Lach., ♂, appendices, from side.

13. *Setodes argentifera*, M'Lach., ♂, neuration of wings; 13 *a*, appendices, from side.



E. M. Lachlan Del.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17a
19c
18
18a

Fig. 14. *Macronema polygrammatum*, M'Lach., ♂, wings.
15. *Macronema digramma*, M'Lach., ♂, wings.

PLATE IV.

Fig. 16. *Hydropsyche colonica*, M'Lach., ♂, appendices, from side; 16 *a*, extremity of penis, from side, more enlarged.
17. *Hydropsyche mauritiana*, M'Lach., ♂, appendices, from side; 17 *a*, extremity of penis, from above, more enlarged.
18. *Hydropsyche modica*, M'Lach., ♂, appendices, from side; 18 *a*, extremity of penis, from side, more enlarged.
19. *Smicridea fasciatella*, M'Lach., ♂, neuration of wings; 19 *a*, maxillary palpus; 19 *b*, appendices, from side; 19 *c*, ♀, extremity of abdomen, from side.
20. *Smicridea saucia*, M'Lach., ♂, neuration of wings; 20 *a*, appendices, from above.
21. *Smicridea murina*, M'Lach., ♂, neuration of wings; 21 *a*, app. inf., much enlarged; 21 *b*, ♀, extremity of abdomen, from side.
22. *Tinodes consueta*, M'Lach., ♂, neuration of wings; 22 *a*, appendices, from above; 22 *b*, the same, from side.
23. *Agapetus celatus*, M'Lach., ♂, neuration of wings; 23 *a*, extremity of abdomen and appendices, from side.

Notes on the White-beaked Bottlenose, *Lagenorhynchus albirostris*, Gray. By JAMES MURIE, M.D., F.L.S., &c., late Prosector to the Zoological Society.

(PLATE V.)

[Read November 17, 1870.]

THE literature concerning this species of Dolphin dates from 1846, when Mr. Brightwell * figured a female taken near Yarmouth under the name of *Delphinus tursio*, but which Dr. Gray † immediately afterwards showed to be a species new to science, and named it as now known. Another contributor was Eschricht ‡, who described as *Delphinus Ibsenii* what appears either this identical species, or but a variety of it, distinguished by a somewhat narrower beak, smaller-sized and more numerous teeth. The venerable Nilsson adopted Eschricht's determination in the 'Scandinavian Fauna.'

* Ann. & Mag. Nat. Hist. vol. xvii. p. 21, pl. ii.
† *Ibid.* p. 35, pls. x., xi., and Zool. 'Erebus and Terror.'
‡ Kongl. Danske Selskab. Kjöbenh. 1847.

he specimen, a full-grown ♂, forming the subject of the pre-
ᴇ communication was captured on the south coast of England
years ago and purchased by Mr. Gerrard for the British
ɪ. It was identified by that gentleman and myself as the
ostris of Dr. Gray. . The skeleton is in the National Col-
um. The generative organs were saved by me, and are put
as a preparation among the physiological series in the College
Surgeons' Museum. Most of the viscera had been removed
prior to receipt of the body.

1. *Dentition.*—In this adult male the numbers were—

$$\frac{24-23\ (+2\ \text{[illegible]})}{\text{[illegible]}}:\ \text{in all}=94.$$

The four or five anterior teeth, both above and below, are small, and they increase in size to about the eighteenth. Between the eighteenth and twentieth the maximum of size is attained, those behind diminishing.

The greatest height of the teeth above the gums is 0·3 inch, the intervals between the teeth being about 0·2 inch. The teeth in the upper jaw are set nearly erect, with, however, a slight obliquity outwards; but the hindmost two or three incline somewhat backwards. The mandibular teeth have much the same direction.

The teeth of the upper jaw have somewhat of a lateral compression: their posterior surface is round, but their anterior one bevelled almost to a knife-like edge. The lower series of teeth fit into the upper set in such a way that the hind surfaces of the former are grooved and rub against the front surfaces of the latter. When the teeth are in opposition, there is an interval of

* Mém. de l'Acad. R. Bruxelles, 1861, t. xxxii. pp. 1 to 38, pls. 1, 2.

† Dissert. de Lagenorhynchis. Killiae, 1853.

‡ Ray Soc. 1866, from Upsala Univ. Arsskrift, 1861–62.

0·1 inch. The two rearmost teeth of the upper jaw are without opposing mandibular ones; and the two foremost teeth of the mandible are likewise free.

2. *Cavity of the mouth.*—Without exceeding the limits of a just comparison, this region might fairly be likened to an inverted funnel, inasmuch as it is relatively long, narrow, and V-shaped. In this respect it differs from the more rounded cavity of the blunt-nosed *Globiceps*; but so far as the lining of the mucous membrane is concerned there is a closer correspondence between these two Cetacean forms. There is this difference, however, or, rather, gradation, of structural change—that the rough anterior palatine patch is of a decided Λ figure in *Lagenorhynchus*, and runs back nearly as far as the twentieth tooth from the front. The roughened patches on the mandibular rami are also very strongly marked. The entire palate and faucial region are of a pale flesh-colour; and there is no distinct uvula, though, as in the "Deductor," the isthmus of the fauces is very much constricted and arched, whilst folds of membrane laterally bound it.

The palate is flat fore and aft, but, if anything, rather transversely concave. A lateral sulcus just within the gums, such as is well impressed in the Ca'ing Whale, barely (if at all) exists in the White-beaked Bottlenose. The interdental ridges, well pronounced in the former, are less prominent in the latter Cetacean.

The tongue is free at the tip for above an inch. In shape, as might be expected from the outline of the bony parts, it is much more narrow and pointed than in the Pilot Whale. Moreover, in the Bottlenose, it is a much softer organ. The dorsum is less smooth, and the edges crenulate.

The papillæ circumvallatæ are prominent. The frænal folds are numerous.

3. *Pharynx, Larynx, and neighbouring Structures.*—The pharynx at where the larynx arises is 3 inches in width. The channel is narrowed in front, and with a baso-median elevation behind, being sharper, at least posterior to the arytenoid cartilages. The lining-membrane is very rugose both longitudinally and laterally. The pharyngeal sphincter in this Bottlenose did not appear to grasp the larynx so firmly as in the Globiceps dissected previously by me. The larynx, which stands up, inclines to the left, causing the passage on its right side therefore to be the wider of the two; and leaving as much as, or more than, 2 inches of free space. The faucial mucous follicles are very numerous. These glands are large, some as much as ½ an inch long, and contorted

end, which is firmly attached by intervening strong fibrous

ong the submucous tissues of the interior of the larynx at
ot of the epiglottis, and just in front of what represents the
vocalis, there appears to be a venous plexus of consider-
thickness. The cylinder is longitudinally three-ribbed and
saccculate inferiorly.

The hyo-epiglottic muscles have the same forward direction and general shape appertaining to the Grampus and Globiceps. Their origin is from the short proximal cartilages of the greater cornua. The fibres, fan-shaped, occupy 1½ inch or thereabouts of the body of the hyoid, and, uniting from opposite sides, run upwards and backwards to the front of the epiglottis, ascending to about its middle.

The mechanical use of these fleshy planes is evidently to draw forwards the epiglottis; but, from the position and angle at which they lay on this, they seem hardly to have the effect of dragging the epiglottis and adjoining arytenoid cartilages flat on the surface of the œsophagus. Their true action, therefore, as I conceive, must be to steady these.

Each lateral half or individual muscle seems equivalent to its opposite in size; and apparently one cannot have more influence than the other in tractile power. Nevertheless there is a certain difference in the plane of obliquity of their relative positions which would render the greater power to the left moiety. By this unequal disposition of the lines of force the glottis would have more sinistral than dextral inclination, leaving one of the pharyngeal floors wider than the other, and thus, as far as

consistent with the structures, obviating the narrowness of the alimentary channel by the presence of the upshot larynx.

Excepting in being moderately developed, the arytenoideus posticus and lateralis present no variation.

The hyoideus, a thick broad plane of fibres, is attached between the cornua. It is tendinous anteriorly, chiefly, however, on the inner side; and the fibres have a direction backwards and downwards: the outer ones are ranged in a different plane from those of the inside, being more perpendicular. It follows from this differentiation in the planes of contraction that, as with the intercostals, the resultant is a diagonal force.

4. *Articulation of the Lower Jaw.*—There is no definite or well-pronounced synovial membrane and sac. What may represent these is an intervening layer of softish fibro-elastic tissue about 0·1 inch thick, which, however, is in nowise separate or distinct from the general fibrous lining of the joint. I specially examined the parts with the object of observing whether any synovial fluid would exude on the fresh joint being cut into; but although the tissues were moist, nothing which I could identify as such exhibited itself.

Between the hollow for the lodgment of the condyle and this process itself there is a general lining of strong glistening fibres. These, at the moveable portion, are soft and yielding. Outside the joint is enwrapped, as it were, by a powerful fibrous investment, which partly interlaces or joins the interarticular fibres. The strongest band of exterior fibres, which would appear to represent the external lateral ligament of anthropotomists has a vertical direction or very slightly obliquely forwards and downwards. The attachment of this ligamentous bridge superiorly is the junction of the squamous and jugal bones, and inferiorly the anterior root of the condyle.

The fibrous substance of the socket or glenoideum merges into the temporal muscle above, and also by a continuation of fibres passes on to the venous network lying immediately on the inner side of the mandible.

John Hunter, in his memorable "Observations on the Structure and Economy of Whales" *, was the first to state of the groups in general that a thick ligamentous substance, with oily particles in the interstices, formed the mandibular articulation, a capsular ligament and double joint being absent.

* Phil. Trans. vol. xvi. p. 314.

same species."

nter's and Knox's observations, however, have been corro-
ed by Carte and Macalister† in the adult Pike Whale, *Ba-*
lera rostrata.

would seem, therefore, that in the adult stage at least genera, two whalebone and one toothed Cetacean (*Physalus, ...anoptera*, and *Lagenorhynchus*), have no synovial capsular articulation of the lower jaw. Whether it exists in their fœtal and young condition and in other species is a matter of uncertainty, as is the reverse or its presence in the adult and old Right Whale.

The muscular structures which most powerfully influence the movement of the lower jaw are the pterygoides. The external one of these is strong, entirely fleshy, arises forwards almost within ½ inch of the last upper tooth; its mandibular insertion is around the inferior dentate foramen.

What represents the levator palati is strongly fleshy in front, narrowing very much behind, latterly ending in a fibro-tendinous portion, which is inserted into the post-inferior surface of the tympanic bone.

5. *The Blow-hole and its diverticular chambers.*—The external narial orifice or spout-hole has a breadth of 2½ inches. The front lip has a crescentic convexity forwards; but the hind one, with somewhat of a mesial peak, bluntly pouts forwards, so as to produce shallow bilateral concavities. The membrane within

* 'Om Nordhvalhen,' Ray Soc. Transl. p. 85.

† Phil. Trans. Roy. Soc. 1868, p. 212.

the superficial margin is lined with dark pigment, and swept round by wrinkles. Eversion of the lips shows a cup-shaped spiracular cavity, on the anterior wall of which are two smooth-surfaced oval prominences meeting in the median line so as to form a V-figure; and these are connected by a strong fibrous septum to the posterior wall. They represent the alar fibro-cartilages.

The anterior or premaxillary sac extends forwards 2·6 inches in front of the orifice of the blow-hole; or if the latter be included, and a post-extension of the spiracular cavity freely communicating with it, the measurement gives 4·4 inches in extreme length. The sac is slipper-shaped, as is common to the group; near its point it is ¾ of an inch in width, and expands behind to 1¼ inch. The interior mucous lining is pale-coloured and smooth-surface; but there is an appearance of submucous venous vascularity at the outer and inner margins.

The maxillary or upper lateral sac is, as usual, flask-shaped, and but 2 inches deep. What I have elsewhere* denominated the naso-frontal sac (the posterior sinus) burrows backward for ½ an inch, and reaches forwards for as much. Its interior was in part choked up with a greasy-like firm mucous substance.

The muscles of the forehead and nasal region of *Lagenorhynchus* are in layers like those of *Phocæna*, *Grampus*, and *Globiocephalus*; but the difference in shape of the bony areas necessitates variation in the extent of the fleshy attachments. Compared with the latter round-snouted genus, the upper layer in the White-beaked Bottlenose reaches more anteriorly in front of the eye—in fact, is continued on to the end of the maxillary or cheek-process of bone. The manner in which it is fixed to the blow-hole aperture shows that its fibres have power chiefly on the upper wall of the maxillary sac; at the same time the muscle, being fixed in front and behind the blow-hole, must act as a complete dilator of the orifice when all the fibres act simultaneously.

The second layer is stronger than the superficial one. Towards the blow-hole it is very aponeurotic. From being radially attached round the outer wall of the maxillary sac, apparently it acts as a tensor of this cavity, whilst through it and by a direct attachment of fibres fore and aft it influences dilatation of the blow-hole. What particularly attracted my attention was the

* Camb. Journ. of Anat. and Physiol. vol. v. p. 125, fig. 1.

anterior portion of the fourth, fan-shaped layer, compared the others, is immensely strong. Its outer, semicircular er is fixed upon the upper surface of the maxillary bone, its r portion to the anterior end. The muscle's posterior border, lly covered by that next to be described, is concave and looks ards; its anterior border has a more sinuous sweep, and ses over the premaxillary sac and the overlying blubber, joining as a bridged band its fellow of the opposite side. An aponeurosis also connects the upper hind border of the muscle with the naso-frontal sac.

As regards the use of the muscle, the front arch, in continuation with its opposite moiety, is a powerful compressor of the nasal blubber, and consequently a contractor of the premaxillary sac. Under certain conditions, also, the said transverse band may close the blow-hole. But, again, if the transverse fibres, which decussate slightly with those of the two superficial layers, act in conjunction with the latter, which seems not improbable, they then would have a tendency to open the blow-hole.

A longish, narrow, triangular muscle of moderate thickness lies posterior to the last, and, as said, partly overlapping it. The upward tendinous apex partially covers the naso-frontal sac, and, behind the mouth of the maxillary sac, winds narrowly round the bone, and is inserted in front of the nasals. Its main office seems to be to compress the posterior or naso-frontal sac.

The fifth layer more fully discloses the lateral and posterior sacs, inasmuch as the muscle or muscles lie outside or in front of these. The fleshy parts exposed may either be considered a

Cetacea*, the orifice terminal. The bulbo-cavernosi, retractores and erectores muscles are of enormous volume.

To give an idea of the enormous volume of the infracaudalis, the so-called psoas of some authors, I need but mention that its fleshy belly measured 51½ inches long, with a breadth at the root of 8 inches, and depth corresponding. Within the abdomen the diaphragm overlays it for more than a foot. The fleshy part, as usual, covers nearly the entire space upon and between the transverse process and the hæmapophyses or chevron bones. On reaching the forty-fifth vertebra, strong tendons emerge from its ventral surface; but latterly and above the fleshy belly narrows, and goes on to a point outside the sixtieth vertebra. The tendons spoken of, some twenty or more in number, run backwards, but are enveloped in an aponeurotic sheath, and separate one by one from this.

Two or three of the last upper tendons unite and constitute one strong thick cord. This proceeds back quite to the hindmost caudal vertebra, where it expands slightly in an aponeurotic form.

This is essentially a powerful flexor of the tail. The upper stronger tendons, carried to the tip of the vertebral column, act the part of a long lever, analogous to the shaft of a screw propeller. The inferior tendons act also on the tail, but in a different manner from the upper ones, inasmuch as, their attachment being from the middle of the chevron bones to the last of the hæmapophyses, their power is distributed. They nevertheless distinctly influence the movements of the caudal fin or tail through their enwrapping sheath, which is directly continued on to and intermingles with the glistening and dense fibroid tissue composing the horizontal tail itself. I have shown in *Physalus* and *Globiocephalus* how the tendons are packed and enwrap each other, both in a longitudinal view and transverse section; so I need add nothing further regarding them here.

The abdominal aorta is wide, its walls moderately thin, and, as in other Cetaceans, there are intercostal plexuses. The series of transverse branches which are derived from the aorta are situate about ½ an inch apart, and nearly equidistant from each other; the secondary divisions commence ⅜ of an inch from the

* *Vide* illustration of that of *Delphinus tursio* in Van Beneden's brochure "De la Composition du Bassin des Cétacés," Bull. Acad. Belg. 2nd ser. tome xxv.

anguli scapulæ is present, and a thin rhomboideus scapulæ, or a slip which diverges towards the head part of the levator anguli scapulæ, which I take to be such.

Muscles connected with the auditory canal are very distinct in *Lagenorhynchus* (as shown in my memoir on *Globiocephalus*, fig. 29). There is a retrahens aurem (*Ret.*), 2¼ inches long and ¼ inch broad, with a somewhat vertical position; a short, thinner, and broader attollens (*Atl.*) in front and above the 2-curved external auditory tube. Also anteriorly, but lower than the latter muscle, there is a slip representative of an attrahens aurem (*Atr.*).

The serratus magnus has three costal digitations; its anterior insertion goes as far as the axis. A double scalenus obtains: the s. anticus, fixed to the cartilage of the first rib, is continued on to the skull; the s. posticus occupies the remainder of the first rib and proceds to the atlas. The longus colli is continued into the chest as far as the sixth dorsal vertebra. The triangularis sterni intervenes between six sternal cartilages. The external oblique clasps more or less all the ribs, a tendon being continued to the first. Its mesial fleshy abdominal border is 3 inches broad, and partially overlaps the outer border of the rectus. What I regard as the pectoralis major has an origin from the manubrium to the fourth-rib cartilage; its fibres thence converge to the proximal root of the fore limb. Whilst the long dorso-spinal muscle corresponds with that of the other Ceti, I may note that, from the close approximation of the numerous long divergent transverse processes, the intertransversales are short, but nevertheless strong; and this remark applies to the interspinalis. The rotatores are numerous. Short muscles lash together the chevron bones.

In the Porpoise, Stammius has named two small lateral muscles of the tail transversarius superior and transversarius inferior. The representatives of these in the White-beaked Dolphin are well developed. The upper one is longish, narrow, and fusiform. It lies above the transverse processes from the fortieth to the sixty-fifth or sixty-sixth vertebra, tapering at either end. The half is fleshy, the posterior half tendinous superficially in its upper half, and slightly muscular on its lower half.

The lower muscle corresponds in many respects with the preceding, but arises further forwards, and stops short a few vertebræ proximal of the other.

These two muscles are relatively weak lateral flexors of the spine.

DESCRIPTION OF PLATE V.

Fig. 1. Hinder segment of the head of the White-beaked Bottlenose (*Lagenorhynchus albirostris*), dissected to show the first or superficial fleshy layer, &c., connected with the blow-hole on the left side.

2. The same specimen, displaying the second layer.
3. The deeper third layer, maxillary sac, &c.
4. Fourth layer, from above downwards, in the same animal.
5. Undermost or fifth layer, naso-frontal sac, &c.

The lettering in these five figures agrees, and is as follows:—

B, through the arrow, points to the blow-hole; *m*, maxillary sac; *nf*, naso-frontal sac; *bl*, blubber and superincumbent tissues; *of*, occipito-frontalis; *L l s a n*, levator labii superioris alæque nasi; *L s p*, levator superioris proprius; *Z*, zygomatici; *Py*, pyramidalis, compressor nasi, &c.; *D a n*, depressor ali nasi, &c.; *Nl*, premaxillary muscle including naso-labialis, &c.; *Sp*, splenii; *Te*, temporalis.

Fig. 6. A view of the articulation of the lower jaw, the joint being partially opened.

c, condyle; *e l*, external lateral ligament; *sq*, squamous; *j*, jugal; and *f*, frontal bones.

7. The opened mouth, looked into from in front. The jaws are dragged asunder much more than is natural even at full gape, so as to bring the faucial structures into view. *T*, tongue.

8. The under surface of the right moiety of the tongue and parts between it and the pharynx.

Mh, mylo-hyoid; *G h*, genio-hyoid; and *G h g*, genio-hyoglossus muscle; *T*, tip of tongue in outline.

9. Rough sketch of portion of the back of the palate and root of the tongue partially dissected.

L, upright laryngeal funnel; *Pg*, palato-glossus; *Lp*, levator palati; *T*, tongue.

Hab. White Nile.

figure was made before I knew that the genus had already published by Dr. Gerstaecker. The species, however, is new, and is a very interesting addition to the genus, as well the fauna of the White Nile. The structure of the rostrum eculiar; there is a delicate ridge along the lower margin, and 's the outer of the three dorsal ridges or carinulæ; between is a flat surface which, for Dr. Gerstaecker, is the scrobe. s, in the species before us, would make part of the scrobe to extend *above* the eye, a peculiarity, I think, without example. (It is well represented in fig. 5 *a*, Pl. VI.) The real scrobes are, I believe, the short, deep, well-defined foveæ at the tip of the rostrum. M. Lacordaire (Gen. vi. p. 57) takes this view, although in a note he puts it the other way "à volonté," at the same time crediting M. Gerstaecker with just the opposite view to that which he holds as I have here stated. See Berliner Monatsbericht, 1855, p. 84, and Reise nach Mossambique, Ins. p. 311, 1862. *Mitophorus* is rather too near *Mitrephorus*, another genus of this family.

PACHYRHYNCHUS ARGUS. (Pl. VI. fig. 6.) *P.* aterrimus, nitidissimus, annulis impressis cæruleis viridibusque e squamis effectis ornatus, in prothorace sex, in elytris viginti-quatuor, quorum duobus communibus sutura pone medium sitis; capite rostroque fere glabris, impunctatis, apice rostri leviter punctato excepto, sulco transverso nullo; prothorace antice rotundato, basi angustato, utrinque annulis tribus decorato; elytris impunctatis; femoribus apicem versus squamoso-annulatis; metasterno abdomineque segmentis duobus basalibus utrinque viridi-annulatis. Long. 7 lin.

Hab. Philippine Islands.

The *Pachyrhynchi* here described are mostly due to the researches of Dr. Semper in the Philippine Islands, and comprise some of the most beautiful and isolated of the genus. Three species only were found by Mr. Wallace in the Malayan archipelago, two of which, derived from Dutch collectors, are described by Van Vollenhoven; the other, *P. cingulatus*, is new. The species vary considerably in colour and the number of spots; the latter are almost entirely formed by scales more or less densely seated in depressions of the derm; sometimes, in some individuals, a few scales may be found scattered on the head and prothorax which are absent in others.

Pachyrhynchus congestus. *P.* niger; nitidissimus; prothorax maculis quinque, elytra maculis numerosis majoribus (circa 20), quarum duabus communibus sutura pone medium sitis, e squamis cæruleatis roseo-marginatis effectis; capite pedibusque omnino glabris, rostro apicem versus subtiliter punctulato leviter transversim sulcato, in medio late profunde excavato; prothorace oblongo, antice fortiter rotundato, postice angustiore, maculis minusculis cæruleatis ornato, una basali, una antica laterali, altera supra insertionem coxarum sita; corpore infra maculis sex similibus et sic ut in præcedente locatis. Long. 7 lin.

The scales in this species are not close together; their colour therefore is not so marked to the naked eye.

Pachyrhynchus cingulatus. *P.* niger, nitidissimus; capite inter oculos ad partem inferiorem fortiter sulcato; rostro basi excepta subrude inæqualiter punctato, in medio leviter triangulariter impresso; funiculo articulis duobus basalibus modice elongatis, clava oblongo-ovali; prothorace subtransverso, utrinque rotundato, margine anteriore albo-squamoso; elytris subovalibus, apicem versus paulo productis, apice ipso singulorum subacuto angulato, manifeste seriatim punctato, in medio fascia mediocri, sutura postice macula rotundata et margine posteriore albo-squamosis; corpore infra cupro-nitente; pedibus pilis adspersis. Long. 5½ lin.

Hab. Morty.

Allied to *P. morotaiensis*, Vollenh., but differs in the character of the rostrum, the longer scape (which might almost place it in *Apocyrtus*) and funicle, elytra more strongly punctured and produced at the apex, &c.

Pachyrhynchus inclytus. *P.* splendide metallice viridis, vittis maculisque e squamis stramineis effectis ornatus; capite inter oculos, genis rostrique apice utrinque squamosis; antennis æneis, nitidis;

transversim corrugatis, regione suturali postice maculis quatuor ... ato-impressis, 2 pone medium, 2 apicem versus obsitis; abdomine ...iter transverse corrugato; tibiis intus subdenticulatis. Long. ... lin.

... Luzon.

Semper informs me that this fine species inhabits pine-... in the mountains of Luzon, at a height of 3000 feet.

...OCYRTUS EROSUS. *A.* niger, nitidissimus, subtus et in capite prothoraceque fere omnino glaber; rostro supra haud excavato, in medio longitudinaliter sulcato, sulco transverso obsoleto; prothorace subcylindrico; elytris ad latera paulo ampliatis, annulis impressis (circa 20) plerisque oblongis, albo-squamulosis; pedibus validis, tibiis posticis intus fortiter denticulatis. Long. 6 lin.

Hab. Luzon.

The delicate rings on the elytra, from the fineness of the scales, have the appearance of being worm-eaten. The three following *Apocyrti* have much the same general appearance; but, as will be seen from their characters, they are, for allied species, very trenchantly differentiated, especially in the females. The colour is variable.

APOCYRTUS WALLACEI. *A.* angustus, metallice viridis, nitidissimus, glaber, maculis cæruleatis e squamis effectis exceptis; capite antice convexo, macula inter, alteraque infra oculos notato; rostro leviter punctato, sulco transverso fortiter impresso, in medio profunde oblongo-excavato; antennis fusco-piceis; prothorace globoso, subtiliter vage punctulato; elytris prothorace angustioribus (♂), latioribus (♀), oblongo-ovatis, modice convexis, postice, præsertim ♀, recurvatis, apicibus obtusis ♂, acute mucronatis ♀, seriatim sat fortiter punctatis, maculis 6–10 ornatis, postice margine exteriore cæruleo-squa-

moso; corpore infra fere glabro; pedibus tenuiter vage pilosis. Long. 5 lin.

Hab. **Batchian.**

Apocyrtus satelles. *A.* **præcedenti affinis, sed prothorace vix globoso, impunctato; elytris ♂ postice vix, ♀ valde incurvatis et apicibus divergentibus. Long. 4–5 lin.**

Hab. **Kaioa; Morty.**

The colour in different individuals varies from golden-green to steel-blue and black.

Apocyrtus nitidulus. *A.* **præcedentibus affinis, sed prothorace vix globoso, impunctato; elytris tenuiter, postice magis punctatis, et in utroque sexu nullomodo recurvatis, ad latera prope apicem sulco arcuato profunde impresso notatis, apice ♂ sat late rotundatis, in fœmina postice productis, apice ipso anguste rotundatis. Long. 4–5 lin.**

Hab. **Waigiou; Salwatty.**

Siteytes glabratus. *S.* **oblongus, ovalis, niger, nitidus, supra denudatus lævis; rostro vage setuloso, inter antennas subgibboso, foveato-impresso; antennis nigris, tenuissime setulosis, scapo valido, funiculo articulis clavaque sat elongatis; prothorace oblongo, utrinque rotundato, basi paulo constricto, haud sulcato, supra subtilissime sparse punctulato; scutello nullo; elytris convexis (♀?), prothorace basi haud latioribus, obsolete seriatim punctulatis, apice anguste rotundatis; corpore infra pedibusque nigris, nitidis, his sparse griseo-setulosis. Long. 7 lin.**

Hab. Saylee.

Very like a *Pachyrhynchus*, but congeneric with *S. lugubris*, Boh., a scarce Philippine-Islands species. The male will probably be found to have somewhat flattened elytra.

Cherrus silaceus. *C.* ovatus, niger, fere omnino subtiliter sat dense squamosis, squamis majoribus elongatis nigris maculatus; funiculo art. basali secundo haud duplo longiore; prothorace fortiter transverso, basi truncato, supra parum depresso, granulis minutis, singulis subtilissime nigro-setigeris, sat confertim munito, lobis ocularibus obsoletis; elytris late ovatis, prothoraci basi æqualibus, in medio latioribus, leviter striato-punctatis punctis minutis, singulis squamam majorem gerentibus, interstitiis latis, perparum convexis; abdomine segmentis tribus ultimis fuscis, lateraliter silaceo-plagiatis; tarsis anticis art. secundo late triangulari. Long. 7–8 lin.

Hab. King George's Sound (Albany).

Allied to *C. vestitus*, Pasc., but with much broader elytra and more lightly striated, the basal joint of the funicle more than twice as long as the second, &c.

…eris munito, interspationibus solis vage squamosis; elytris ovatis, …horace angustioribus, tenuiter striato-punctatis, punctis parvis …emotis, singulis squamam majorem gerentibus, interstitiis latis, pla… ; tarsis anticis art. secundo æquilato-triangulari. Long. 9 lin.

…ing George's Sound.

…three species, with *C. vestitus*, form a distinct section of …, differentiated by their round, not ovate, eyes, the nearly …solete ocular lobes, and the upper surface without tubercles and costæ. With regard to the lobes, their disappearance will probably be found to be gradual; otherwise, or perhaps as it is, they might be generically separated.

Episomus fimbriatus. *E.* oblongus, ovatus, niger, squamositate vinaceo-grisea dense tectus; rostro crasso, trisulcato, sulcis lateralibus tenuiter impressis; funiculo brevi, articulo ultimo valde transverso; prothorace oblongo, subcylindrico, rugoso, in medio fortiter sulcato; elytris valde convexis, postice ampliatis, humeris obliquis, sulcato-punctatis, punctis profundis, remotis, interstitiis latis, elevatis, maculis magnis duabus, una basali, altera apicali, fasciaque lata pone medium late fuscis viridulo-marginatis ornatis, ad latera circa puncta aureo-lavatis; corpore infra pedibusque vinaceo-griseo-squamosis, his breviter setulosis. Long. 8 lin.

Hab. Sarawak.

This is the only species from Borneo in Mr. Wallace's collection, and will be at once distinguished by its broad brown band and apical spot finely edged with pale green.

Episomus turritus. *E.* subovalis, niger, ubique dense griseo-squamosus; rostro crasso, latitudine fere sesquilongiore, trisulcato; funi-

culo articulo ultimo elongato; prothorace vix oblongo, utrinque irregulariter rotundato, supra rugulis intricatis munito, in medio inæqualiter sulcato; scutello parvo, triangulari; elytris medio paulo ampliatis, postice abrupte declivibus, sulcato-punctatis, sulcis rugis denudatis transversis divisis, cum ipsis puncta quadrata formantibus, interstitiis 3. 5. 7. elevatis, illo postice tuberculo valido instructo, duobus exterioribus arcuatis, extimo in medio elevato; corpore infra pedibusque pilis adspersis. Long. 8 lin. (rost. incl.).

Hab. North China.

In very fresh specimens the scales so densely cover the derm that the sculpture here described is very imperfectly seen. This species, which by its tuberculate elytra is very distinct, is known in the Paris collections by the name here adopted. It is sometimes clouded with brown above.

EPISOMUS ICONICUS. *E.* ovatus, niger, squamis plerumque griseis sejuncte tectus, squamis elongatis vage interjectis; rostro latitudine haud longiore, medio fortiter sulcato, sulcis lateralibus fere obsoletis; scapo breviusculo, sensim valide crassiore, curvato; funiculo brevi, articulo ultimo clavaque nigris; prothorace transverso, utrinque paulo rotundato, supra trisulcato, lateribus vage punctato-impresso, fuscescente; scutello inviso; elytris latitudine sesquilongioribus, modice convexis, lateraliter rotundatis, remote sulcato-punctatis, interstitiis convexis, regione basali posticeque griseis, cætera fuscescentibus; corpore infra pedibusque squamis piliformibus adspersis. Long. 3 lin. (rost. incl.).

Hab. Cambodia.

A slightly aberrant form and the smallest of the genus, having a short curved scape, and the last joint of the funicle so closely adnate to the clava as to make the former appear six-jointed.

DEMENICA.

(Otiorhynchinæ.)

Rostrum quam caput angustius, basi transversim subsulcatum; *scrobes* subterminales, ante oculos evanescentes. *Scapus* crassus, squamosus; *funiculus* filiformis, 7-articulatus, articulis duobus basalibus longiusculis, cæteris obconicis; *clava* ovalis, distincta. *Oculi* oblongi, vix prominuli. *Elytra* basi truncata. Cætera ut in *Episomo.*

Like *Antinia*, this genus has the club distinct from the funicle; in this, as well as in the narrower rostrum and truncate base of the elytra not projected on to the prothorax, it differs from *Episomus.* In *Simallus*, another allied genus, the club is so closely

legs are furnished with numerous stiff elongate scales; the tibiæ at the apex have two rows of stout black setæ.

BRYOCHÆTA SUFFLATA. (Pl. VI. fig. 7.) *B.* ovato-ampliata, nigra, dense opalescenti-griseo-squamosa; capite inter oculos longitudinaliter sulcato; rostro in medio fortiter excavato, squamis suberectis densissime vestito; antennis griseis, funiculo saturatiore; prothorace transverso, subcylindrico, rude vage punctato; elytris subglobosis, striato-punctatis, striis nudis nitidis, inter puncta granuliformibus, interstitiis convexis; corpore infra viridi-lavato. Long. 5 lin.

Hab. Old Calabar.

BRYOCHÆTA VIRIDIS. *B.* ovata, nigra, squamis concoloribus viridibusque dense vestita; capite inter oculos sulco abbreviato; rostro in medio modice excavato, squamis concoloribus arcte adpressis; antennis nigris; prothorace longitudine haud latiore, subcylindrico, remote punctato, margine basali viridi-squamoso; elytris obovatis, striato-punctatis, striis nudis nitidis, inter puncta granuliformibus, marginibus interstitiorum squamis viridi-metallicis ornatis, postice et ad latera totis viridi-squamosis; corpore infra dense viridi-squamoso; pedibus roseo-squamosis. Long. 5½ lin.

Hab. Old Calabar.

BRYOCHÆTA PUSILLA. *B.* ovata, picea, dense fusco-squamosa; capite inter oculos haud sulcato; rostro angustiore, supra planato; prothorace transverso, utrinque paulo rotundato; elytris subcordatis, striatis, impunctatis, interstitiis vix convexis, squamis majusculis erectis remote munitis, regione suturali fasciaque ante medium griseis; corpore infra pedibusque dense griseo-squamosis. Long. 2 lin.

Hab. West Africa.

EUPIONA.

(Otiorhynchinæ.)

Bryochæta congruit, sed *funiculo* tenuato, filiformi, et *clava* ovata, normali.

The only exponent of this genus has precisely the habit of *Bryochæta sufflata*; but from this it is essentially differentiated by the normal form of the antennæ.

EUPIONA ATTALICA. *E.* ovata, nigra, squamis roseo-griseis omnino, elytris viridulis exceptis, tecta; capite rostroque in medio longitudinaliter excavatis, sulco transverso abbreviato; prothorace subcylindrico, transverso; elytris subglobosis, seriatim punctatis, punctis oblongis approximatis, glabris, nigris, interstitiis squamis viridi-aureis micantibus lineatim instructis; antennis pedibusque vage nigro-setulosis. Long. 4 lin. (rost. incl.).

Hab. Old Calabar.

ANTINIA.

(Otiorhynchinæ.)

Ab *Episomo* differt *scrobibus* profundis, nudis, infra oculos inclinatis, scapo prothoracem haud attingente.

In *Episomus* the scrobes are confined, so to say, to nearly the point of origin of the antennæ, or are marked behind by a generally broad shallow impression, which entirely disappears in front and before attaining the eye, and is invariably closely covered by scales of the same character as the rest of the rostrum. The description of this part is not very satisfactory either in Schönherr or Lacordaire. The scape in *Episomus* impinges more or less on the prothorax; but here it passes only just within the anterior border of the eye.

ANTINIA EUPLEURA. (Pl. VI. fig. 3.) *A.* oblongo-ovata, nigra, omnino dense isabellino-squamosa opalino-lavata, setisque numerosis interjecta; oculis subrotundatis; capite per strigam transversam a rostro distincto, fronte longitudinaliter sulcato, pone oculos transversim excavato; rostro supra longitudinaliter excavato, plaga triangulari antice excisa; antennis squamosis, funiculo art. secundo primo paulo lon-

Platyomicus pedestris. (Pl. VI. fig. 8.) *P.* subovatus, omnino dense squamosus, supra pallide cervino-fuscus, albido varius; rostro paulo longiore quam latiore; prothorace transverso, utrinque angulato, medio nigro profunde sulcato, basi ad latera excavato; scutello elevato; elytris oblongo-cordatis, remotius striato-punctatis, postice

vittis duabus fuscis notato; scutello inconspicuo; elytris cordatis, striato-punctatis, interstitiis angustis, alternis elevatis, fasciis duabus obscuris notatis, una ante, altera pone medium, illa postice sensim evanescente; femoribus subannulatis. Long. $4\frac{1}{2}$ lin. (rost. incl.).

Hab. N'Gami.

The first of these species is distinguished from *P. echinus*, Fab., by the absence of the larger tubercles. The second is a somewhat aberrant species, having the scrobes straighter, less limited behind, a smaller oval eye less coarsely facetted, and prothorax not tuberculated at the sides.

Cychrotonus.

(Otiorhynchinæ.)

Rostrum breve, capite angustius, basi transversim sulcatum; *scrobes* arcuatæ, infra oculos exeuntes. *Scapus* tenuatus, oculum superans; *funiculus* filiformis, 7-articulatus, articulis tribus basalibus breviusculis, cæteris brevioribus; *clava* distincta. *Oculi* prominuli. *Prothorax* transversus, utrinque rotundatus, basi apiceque truncatus. *Elytra* basi prothorace haud latiora,

compressa. *Femora* modice incrassata; *tibiæ* rectæ, corbulis posticis cavernosis; *unguiculi connati*. *Processus* intercoxalis antice angulatus.

This genus has more the habit of some of the species of *Sciobius* than of *Episomus*, to which, on account of its cavernous corbels and connate claws, it is most allied.

CYCHROTONUS VIDUATUS. *C.* ovalis, niger, subnitidus, fere glabratus; capite inter oculos sulcato; rostro fortiter tricarinato; prothorace crebre punctato, punctis nonnullis squama alba repletis; elytris profunde sat confertim fortiter punctatis, interstitiis subtilissime punctulatis squamis albis remote adspersis; corpore infra pedibusque sparse albo-squamosis. Long. 4 lin. (rost. incl.).

Hab. N'Gami.

The genera allied to *Episomus*, of which two only were known to Lacordaire, may be thus tabulated:—

Prothorax produced on each side at the base.
Zyrcosa, Pasc.
Prothorax not produced.
Elytra broader at the base than the prothorax.
Platyomicus, Thoms.
Elytra not broader at the base than the prothorax.
Scrobes at the apex of the rostrum nearly contiguous.
Syntaphocerus, Thoms.
Scrobes widely apart at the apex.
Intercoxal process gradually narrower and forming an angle anteriorly.
Elytra at the base projecting on the prothorax.
Scrobes terminating before the eye.
Episomus, Schön.
Scrobes terminating beneath the eye.
Antinia, n. g.
Elytra truncate at the base.
Scrobes terminating beneath the eye.
Cychrotonus, n. g.
Scrobes terminating before the eyes.
Rostrum as broad as the head. *Simallus*, Pasc.
Rostrum narrower than the head.
Demenica, n. g.
Intercoxal process broad and truncate anteriorly.

crassata, mutica; *tibiæ* validæ, fere rectæ, unco horizontali armatæ, posticæ corbellis cavernosis; *tarsi* angusti, articulis tribus basalibus infra apice ciliatis, quarto elongato; *unguiculi* divergentes; coxæ anticæ contiguæ. *Metasternum* breve. *Abdomen* sutura prima obsoleta, segmentis 3° 4° angustissimis.

It is with some hesitation that I place this genus with Molytinæ, the subbasal scrobes being at variance with the character of the subfamily; it may be only a sexual peculiarity. The ciliate tarsi are found in *Anisorhynchus*; the partially ridged margin of the side of the prothorax occurs also in some *Anchoni*.

Tiphaura funerea. (Pl. VI. fig. 10.). *T.* late ovata, nigra, nuda; rostro prothoracis longitudini æquali, æquilato (♂?), tenuiter oblongo-punctato, basi subsulcato; antennis obscure piceis; prothorace subtiliter crebre papillato-punctato, in medio linea impunctata notato; elytris striatis, interstitiis latis, subplanatis, obsolete punctatis; corpore infra sordide fusco; pedibus setulis silaceis dispersis; tarsis articulo ultimo subtestaceo. Long. 4 lin.

Hab. Para.

Styanax.

(Gonipterinæ.)

Rostrum breve, validum; *scrobes* obliquæ, vel subtransversæ, infra oculos arcuatæ. *Scapus* perbrevis, oculum attingens; *funiculus* crassus, articulis duobus basalibus longioribus, cæteris valde

transversis, gradatim latioribus; *clava* breviter ovata, distincta. *Oculi* oblongi, transversi, fortiter granulati. *Prothorax* conico-cylindricus, basi subbisinuatus, apice parum productus. *Elytra* prothorace latiora, oblonga, parallela, modice convexa. *Femora* compressa, incrassata, infra dentata; *tibiæ* validæ, compressæ, intus bisinuatæ et denticulatæ, apice uncis duobus armatæ; *tarsi* robusti; *unguiculi* parvi, liberi. *Abdomen* normale. *Processus* intercoxalis anguste triangularis.

The only character by which this genus differs from Gonipterinæ as defined by Lacordaire is the narrow intercoxal process. As to the spurs of the tibiæ, they are well marked in some *Gonipteri*, e. g. *G. lepidotus*, though there is but one to each. The solitary specimen on which this genus is founded is the sole representative of the subfamily, of which more than fifty species are found in Australia, contained in Mr. Wallace's Malayan collections.

Styanax carbonarius. (Pl. IX. fig. 4.) *S.* ater, nitidus; capite rostroque crebre punctatis, hoc in medio breviter carinato; prothorace confertim rude granulato, granulis singulis apice setulam gerentibus; scutello rotundato, ochraceo-squamoso; elytris sulcato-favosis, interstitiis paulo elevatis, quinto postice tuberculo mediocri instructo, apicibus intus subemarginatis; corpore infra pedibusque rugoso-punctatis, setulis pallidis adspersis. Long. 5 lin.

Hab. Sumatra.

Aparete.

(Aterpinæ.)

Rostrum quadrangulare, capite vix longius; *scrobes* submedianæ, obliquæ, arcuatæ, infra oculos terminantes. *Oculi* rotundati, parum prominuli, subgrosse granulati. *Scapus* sensim incrassatus; *funiculus* 7-articulatus, articulo primo longiusculo, cæteris transversis, ultimo clavam quasi incipiente. *Prothorax* oblongus, cylindricus. *Elytra* subparallela, convexa, prothorace multo latiora, basi apiceque truncata, humeris producta. *Femora* in medio incrassata; *tibiæ* flexuosæ, muticæ; *tarsi* lineares, subtus ciliati, articulo primo breviter triangulari, secundo transverso, tertio haud lobato, quarto valido, cæteris conjunctim longiore; *unguiculi* liberi, divergentes. *Abdomen* normale.

The quadrangular rostrum, the seventh joint of the funicle closely connected to the club, and narrow tarsi, ciliated beneath, form a very trenchant diagnosis of this genus, which in habit is similar to *Ethemaia*.

put exsertum, supra quadratum. *Rostrum* breve, validum, subdifforme; *scrobes* laterales, obliquæ, infra rostrum conniventes; *mandibulæ* crassæ. *Oculi* rotundati, prominuli, laterales, e prothorace distantes. *Antennæ* tenuatæ; *scapo* curvato, subclaviformi; *funiculo* 7-articulato, art. duobus basalibus longiusculis, primo crasso, cæteris brevioribus; *clava* distincta, ovali. *Prothorax* subcylindricus, basi apiceque truncatus. *Elytra* elongata, cylindrica, prothorace latiora, basi projecta, postice subito declivia. *Femora* vix crassa; *tibiæ* anticæ et intermediæ sat attenuatæ, curvatæ, posticæ rectæ, omnes unco obliquo terminatæ; *tarsi* modice elongati, art. tertio late bilobo, ultimo attenuato; *unguiculi* liberi. *Abdomen* segmentis duobus basalibus ampliatis. *Processus* intercoxalis æquilateraliter triangularis.

A remarkable genus, which I have no hesitation in connecting, although at a long interval, with the Australian *Ethemaia* and neighbouring genera.

Dexagia superciliaris. (Pl. VII. fig. 2.) *D.* elongata, nigra, dense umbrino-squamosa, albido varia; capite supra oculum elevato-cristato; rostro supra in medio bituberculato, apicem versus excavato, nigro nudo, crebre et fortiter punctato; antennis ferrugineis, nitidis, funiculo articulis quatuor ultimis ovatis, clava magna; prothorace oblongo, pone apicem late constricto, lateribus albidis: elytris seriatim punctatis, punctis magnis, exterioribus quadratis, interstitiis 3. et 5. costatis, costis postice subito determinatis, in medio et ante apicem cristatis, lateribus apiceque albidis; corpore infra pedibusque sordide albidis; abdomine segmentis tribus ultimis fuscis. Long. 4 lin.

Hab. Batchian.

Hypermetra.

(Aterpinæ.)

Dexagiæ omnino congruit, præter *scrobes* infra rostrum haud conniventes; et *tibiæ* apice latiores, uncis carentes. *Corpus* cylindricum.

The only exponent of this genus is a peculiar insect, very different in appearance to the last, though the generic characters are almost the same. The scales on the upper part, except at the apex of the elytra, are so exactly like the derm they cover as to be easily overlooked.

Hypermetra analis. (Pl. IX. fig. 5.) *H.* elongata, brunnea, supra squamis concoloribus, apice elytrorum excepto, tecta; capite rostroque sat nude pallido-squamosis, hoc dimidio apicali paulo excavato; antennis piceis; funiculo articulis quinque ultimis rotundatis, extrorsum sensim crassioribus; prothorace latitudine fere sesquilongiore, disperse punctato, punctis leviter impressis, unisquamigeris; scutello distincto, orbiculari; elytris latitudine plus triplo longioribus, striato-punctatis, punctis elongatis, vix approximatis, unisquamigeris, interstitiis modice convexis, apice sat subito declivibus, dense albido-squamosis, et singulatim tuberculo magno instructis; corpore infra pedibusque subpiceis, squamis albidis vix dense tectis. Long. 2½ lin. (rost. incl.).

Hab. Mysol.

The number of genera of *Aterpinæ* has now been so augmented that the following Table will be useful:—

Tibiæ spurred .... *Dexagia*, n. g.
Tibiæ not spurred.
  With ocular lobes.
    Funicle 6-jointed.
      Metasternum normally long ...... *Aterpus*, Schön.
      Metasternum short.............. *Iphisaxus*, Pasc.
    Funicle 7-jointed.
      Shoulders pointed, often tuberculate. *Lophotus*, Schön.
      Shoulders rounded .... *Rhinoplethes*, Pasc.
  Without ocular lobes.
    Body more or less ovate.
      Scrobes median or basilar.
        Scrobes median, oblique........ *Pelororhinus*, Schön.
        Scrobes basilar, transverse ...... *Rhinaria*, Kirby.
      Scrobes terminal, or nearly so.

PÆPALOSOMUS ZONATUS. *P.* elongatus, cylindricus, niger, fasciis niveo-squamosis varius; rostro piceo, nitido, vage punctato; antennis testaceis; prothorace leviter punctato, in medio longitudinaliter sulcato, utrinque niveo-squamoso; scutello subrotundato; elytris prothorace paulo latioribus, striato-punctatis, interstitiis planatis, vage setulosis, fasciis tribus niveis ornatis, una subbasali, una media, altera postica; corpore infra pedibusque subnitidis, tibiis tarsisque pubescentibus. Long. 4–5 lin.

Hab. Batchian; Morty; Gilolo; Ceram; Kaioa; Key; Aru; Dorey; Saylee.

The only other described species of this genus (*P. dealbatus*, Boisd.) is, in a fresh state, densely covered with an elongate inflorescence, pure white, and very delicate. There is some doubt in regard to its locality, Schönherr giving Manilla, and Boisduval New Guinea; it probably occurs in both; Mr. Wallace found it at Sarawak and in Gilolo, Batchian, Morty, Makian, Kaioa, Tidore, Bouru, Ternate, Key, and Waigiou. Lacordaire was acquainted with two other species, from Borneo and Cochin China respectively; the former is probably the one here described. A specimen from Java is shorter and less cylindrical, and is possibly distinct.

HYLOBIUS FASCIATUS. (Pl. VII. fig. 9.) *H.* ovatus, niger, nitidus; capite rostroque fere nudis, illo crebre punctulato, inter oculos fovea profunda insculpto, hoc fortiter vage punctato, punctis unisquamigeris; funiculo articulo ultimo obconico; clava elongato-ovali; prothorace subconico, crebre sat fortiter punctato, fascia nivea subapicali, supra interrupta, notato; scutello subcordiformi; elytris basi latioribus, postice gradatim angustatis, fortiter seriatim punctatis, macula utrinque basali fasciisque duabus niveo-squamosis, una in medio interrupta, altera communi postica decoratis; corpore infra pedibusque pilis exiguis niveis vage irroratis. Long. 8 lin.

Hab. Morty; Batchian; Ceram.

infra pedibusque
spersis; femoribus
5 lin.

Hab. Sarawak.

Hylobius papulo
exiguis parce adsp
punctatis, punctis
funiculo tenuiore;
terstitiis granulati
transverso; elytris
convexis, apicibus
scentibus vage ads
extus saturatioribus. Long. 4 lin.

Hab. Java.

Hylobius aphya. *H.* oblongus, angustus, niger, subnitidus, pilis flavescentibus adspersus; rostro prothorace paulo breviore, basi sulcato-punctato, extrorsum nitido sensim subtiliter vage punctulato; antennis ferrugineis, clava ovata, distincta; prothorace subtransverso, utrinque modice rotundato, basi truncato, supra rugoso-punctato; scutello triangulari; elytris prothorace multo latioribus, subparallelis, apicibus angulato-mucronatis, striato-punctatis, punctis subapproximatis, interstitiis parum convexis, maculis paucis, præcipue postice, e pilis condensatis effectis, adspersis; corpore infra pedibusque nigris nitidis, parce pilosis. Long. 4 lin.

Hab. India.

A narrow species, otherwise not unlike *H abietis.*

Ectinura.

(Hylobiinæ.)

Rostrum subtenuatum, arcuatum: *scrobes* subterminales, obliquæ. *Oculi* mediocres, subovati, subtenuiter granulati. *Antennæ* graciles; *scapus* apice clavatus; *funiculus* 7-articulatus, articulis duobus basalibus longiusculis, secundo longiore, cæteris breviter obconicis, ultimo crassiore; *clava* adnata, articulata, velutina. *Prothorax* oblongus, subcylindricus, basi subbisinuatus, lobis ocularibus distinctis. *Elytra* parum convexa, angusta, pone medium gradatim attenuata, singula in caudam cylindricam producta. *Pedes* attenuati; *femora* paullo incrassata, infra dente parvo armata; *tibiæ* teretes, elongatæ, flexuosæ, apice uncinatæ; *tarsi* longiusculi, articulo tertio profunde bilobo; *unguiculi* divaricati. *Abdomen* segmentis duobus basalibus peramplis.

A remarkable form, on account of the prolongation of the elytra as in some of the *Brenthidæ*. The only example I have seen was kindly presented to me by Mr. E. Sheppard, and belonged to the late Mr. Curtis. There was no locality named; but the colour of the bit of paper attached, in the old slovenly way, appeared to indicate that it was from South America; its resemblance, however, to *Hylobius aphya* leaves very little doubt in my mind that it is from India.

Ectinura brenthoides. (Pl. VII. fig. 10.) *E.* **angusta, piceofusca, subnitida, squamis dispersis silaceis vestita; capite inter oculos depresso; rostro prothorace cum capite parum longiore, basi confertim punctato; antennis fuscis, nitidis; prothorace utrinque leviter rotundato, antice paulo angustiore, crebre impresso-punctato, punctis singulis squama flava munito; scutello triangulari, nitido; elytris prothorace paulo latioribus, humeris rotundatis, supra leviter at sat vage punctatis, punctis squamigeris, interstitiis squamis minoribus parcius dispersis, pone medium squamis majusculis condensatis (circa sex) maculam parvam formantibus; corpore infra pedibusque disperse squamosis. Long. 5 lin.**

Hab. India?

Scolithus.

(Hylobiinæ.)

Rostrum validum, modice elongatum, parum arcuatum, utrinque stria dimidiata ante oculum impressum; *scrobes* præmedianæ, obliquæ, infra oculos longe exeuntes. *Scapus* breviusculus; *funiculus* 7-articulatus, art. brevibus, quinque ultimis transversis; *clava* brevis, adnata, quadriarticulata. *Oculi* grosse granulati, transversi, laterales. *Prothorax* oblongus, basi bisinuatus, lobis ocularibus distinctis. *Elytra* oblongo-ovata, versus apicem callosa. *Pedes* validi; *femora* in medio incrassata, subtus dentata; *tibiæ* compressæ, flexuosæ, apice intus uncinatæ; *corbulæ* posticæ elongatæ; *tarsi* infra spongiosi, art. basali modice elongato, tertio late bilobo, quarto elongato; *unguiculi* liberi. *Propectus* antice emarginatum. *Abdomen* segmento secundo mediocri.

The club of the antennæ is four-jointed in this genus, while in in *Aclees*, to which it is allied, it is only two-jointed; it is further distinguished from that genus by its ocular lobes, emargination of the propectus, and direction of the scrobes. The latter character distinguishes it from *Hylobius*.

SCOLITHUS ACUMI terrupte griseo- v impresso; rostro carinulato, carinu versim sitis, om clava brevissima, pallidioribus cons atim triangulari; bus, subparallelis, riatim impressis, triente medio, sut et versus apicem sat dense albido-
Hab. Sarawak.

ACLEES POROSUS. *A.* oblongo-ovatus, niger, subnitidus, omnino parce griseo-setulosus; fronte fovea elongata impressa; rostro tenuiore, prothorace cum capite longiore, confertim punctato; oculis subrotundatis; clava funiculo longitudine fere æquali, articulo basali aequilongiore quam latiore, dense griseo-pubescente; prothorace ampliato, utrinque valde rotundato, apicem versus subtilius, reliquo mediocriter crebre punctato; scutello subcordiformi; elytris basi latioribus, lateraliter leviter rotundatis, parum convexis, haud elevatis, striato-punctatis, punctis rotundatis, modice approximatis, interstitiis convexis, callo postico minus distincto; corpore infra pedibusque nigris, parum pubescentibus; tarsis piceis pubescentibus. Long. 6–7 lin.
Hab. Sarawak; Batchian; Kaiou; Ceram; Morty; Bouru; Amboyna; Matabello; Ternate; Aru; Dorey; Saylee.

Allied to *A. cribratus*, Gyll., but with a longer and more slender rostrum, the club of the antennæ nearly as long as the funicle, and its basal joint considerably longer in proportion to its breadth, the punctuation generally less rugose, and the interstices of the elytra not elevated.

ACLEES GYLLENHALLII. *A.* oblongo-ovatus, niger, subnitidus, parce silaceo-setulosus; fronte fovea in canaliculum rostri currente; rostro prothorace vix longiore, supra subcarinato, versus apicem latiore; oculis transversis; clava funiculi longitudine dimidia, articulo basali transverso, dense griseo-pubescente; prothorace oblongo, subconico, utrinque leviter rotundato, confertim mediocriter punctato, punctis antice paulo minoribus; scutello transverso, subcordiformi; elytris modice ampliatis, subparallelis, supra parum depressis, seriatim punctatis, interstitiis tam longitudinalibus quam transversis intricato-granulatis, callo postico leviter elevato; corpore infra pedibusque nigris, nitidis, parcius squamulosis. Long. 8 lin.

Hab. Waigiou; Amboyna.

At once differentiated by the eyes and the sculpture of the elytra.

SELEUCA.

(Hylobiinæ.)

Rostrum validiusculum, arcuatum, supra tricarinulatum, setulis transversis munitum, utrinque ante oculum stria abbreviata notatum; *scrobes* subterminales, obliquæ, infra marginem inferiorem oculorum currentes. *Scapus* oculum attingens; *funiculus* 7-articulatus, art. duobus basalibus breviter obconicis, primo crassiore, cæteris transversis, gradatim latioribus; *clava* ovata, pubescens. *Oculi* grosse granulati. *Prothorax* oblongus, lobis ocularibus distinctis. *Elytra* ampla, oblonga, subdepressa, humeris rotundatis. *Pedes* validi; *femora* incrassata, subtus uni- tridentata; *tibiæ* sulcatæ, anticæ flexuosæ, reliquis arcuatis, apice uncinatæ; *tarsi* subtus spongiosi, art. basali triangulari, tertio bilobo, ultimo elongato; *unguiculi* liberi, divergentes. *Coxæ* anticæ haud contiguæ. *Abdomen* normale.

Among the *Hylobiinæ* this genus and *Pissodes* are the only ones with the anterior coxæ not contiguous; in the latter there are no ocular lobes, and the tarsi are only partially spongy beneath. According to Mr. Wallace's note, *S. leucospila* is found on leaves.

SELEUCA AMICTA. (Pl. IX. fig. 7.) *S.* nigra, squamis ovatis albis interrupte vestita; rostro basi latiore et antice valde arcuato; antennis piceis; prothorace utrinque antice rotundato, apice fortiter tubulato, lateribus parallelis, supra in medio depresso, vage punctato, lateraliter niveo-figurato; scutello parvo; elytris subparallelis, striato-punctatis, dense albo-squamosis, regione suturali lateribusque maculis denudatis nigris interruptis, præcipue una communi mediana cordiformi, una obliqua laterali pone medium; corpore infra fusca, subnitida; femoribus dente valido instructis, dimidio apicali supra dense niveo-squamosis; tarsis ferrugineis. Long. 3 lin.

Hab. Singapore.

SELEUCA LEUCOSPILA. *S.* nigrescens, squamis elongatis niveis in maculas condensatis; capite rostroque castaneis, sparse niveo-squamosis, hoc fere æquilato, modice arcuato; antennis piceis; prothorace utrinque antice rotundato, pone medium subparallelo, supra vage punctato, lateraliter niveo-maculato; scutello oblongo; elytris subparallelis, striato-punctatis, maculis niveis ornatis; corpore infra

pedibusque fuscis, subnitidis; squamosis, anticis bi-, interm subunidentatis; tarsis fulvidis.

Hab. Singapore; Sarawak; Pen

Ni

(Hyl

Hylobio omnino congruit, præt

There is no other genus with ... and in the allied subfamilies it is a very exceptional character. There are three well-marked species, of which two are described below; all my specimens appear to have been covered with a dull greyish crust or squamosity, in addition to ordinary scales, that seems to be easily detached, except in the punctures.

Niphades pardalotus. (Pl. IX. fig. 8.) *N. oblongus, niger, opacus; rostro valido, rude sulcato-punctato, interstitiis lineas longitudinales formantibus; antennis piceis; prothorace subcylindrico, rugoso-punctato, punctis squamigeris; scutello dense squamoso; elytris prothorace multo latioribus, utrinque parallelis, leviter sulcato-punctatis, punctis rotundatis approximatis squamigeris, guttulis niveis e squamis erectis effectis sat parce adspersis; corpore infra obscure piceo; femoribus posticis versus apicem niveo-annulatis.* Long. 4–5 lin.

Hab. Sarawak.

Niphades costatus. *N. oblongus, niger, squamositate sordide grisea indutus (nisi derasa); rostro valido, rude sulcato-punctato, insterstitiis lineas longitudinales formantibus; capite prothoraceque rugosis crebre punctatis, punctis unisquamigeris, hoc subcylindrico; scutello parvo, ovato; elytris prothorace fere duplo latioribus, fortiter sulcato-punctatis, punctis minus approximatis, interstitiis uniseriatim granulatis, 3. 5. 7. tuberculato-elevatis, et fere obsolete albo-guttatis, guttis e squamis erectis effectis; corpore infra pedibusque concoloribus, sub squamositate nigris, subnitidis.* Long. 4–4½ lin.

Hab. Aru; Batchian; Macassar.

A stouter species than the last, and differing, *inter alia*, in the sculpture of the elytra.

Ozoctenus.

(Hylobiinæ.)

Rostrum modice elongatum, rectum; *scrobes* præmedianæ, obliquæ, infra oculos desinentes; *scapus* oculum haud attingens; *funi-*

culus 7-articulatus, articulo primo crassiore, longiusculo, secundo paulo breviore, cæteris transversis; *clava* magna, ovalis. *Oculi* laterales, grosse granulati. *Prothorax* oblongus, subcylindricus, basi bisinuatus, margine inferiore antice fortiter emarginato. *Elytra* prothorace paulo latiora, elongata, parallela, basi producta, postice subito declivia; *femora* clavata, posteriora apicem elytrorum superantes, pedunculata, in medio fortiter clavata et processu triangulari denticulato munita; *tibiæ* breves, arcuatæ, compressæ; *tarsi* normales; *coxæ* anticæ parum sejunctæ. *Abdomen* segmentis duobus basalibus valde ampliatis.

The type of this genus is very like some of the smaller Australian *Orthorini*, to which, in fact, it is closely allied, differing principally in the character of the tibiæ and of the posterior femora; the latter are very remarkable, and can only be paralleled among the Tachygoninæ, a subfamily of the Aulacostethous category. From a slight difference in the rostrum I suspect my two examples are male and female.

Ozoctenus jubatus. (Pl. IX. fig. 3.) *O.* elongatus, fuscus, griseo-squamosus; rostro prothorace breviore, squamoso; antennis subpiceis; clava longitudine funiculi æquali; prothorace utrinque paulo rotundato, supra longitudinaliter tricristato, cristis lateraliter abbreviatis, in medio sitis, intermedia alte elevata, compressa, pone medium abrupte terminata; scutello oblongo, albo-squamoso; elytris cylindricis, fortiter seriatim punctatis, interstitiis tertio quintoque elevatis, granulatis et basin versus cristatis, apice albido-squamosis; corpore infra nigro, subnudo; pedibus griseo-squamosis; tibiis posticis valde arcuatis, prope basin angulato-dilatatis. Long. 2½–3 lin.

Hab. Amazons (Ega).

Dicordylus pupillatus. (Pl. VI. fig. 1.) *D.* ferrugineus, nitidus, subtus pube alba variegatus; prothorace subconico, subtiliter punctato, septemvittato; elytris postice sensim angustioribus, sat crebre irregulariter punctatis, lineis interruptis ochraceis basi apiceque ornatis, singulis medio annulo niveo conspicue notatis. Long. 6 lin.

Hab. Chili.

The diagnoses of this and the following species are drawn up to contrast with the two described by Lacordaire. In this species, which approximates to *D. heilopoides*, the elytra are gradually narrowed to the apex, which is deeply and angularly emarginate, with the outer angle on each side rather produced; the femora

are longer and more
beneath; the anterio
the posterior very s
elytron is very marke
some individuals of *D.*

Dicordylus luctu
jectis, vestitus, mac
obscure irroratus; p
ampliato; scutello e
sim rugosis, tuberc
pone medium fascia

Hab. Chili.

This species differs from *D. ithyceroides*, *inter alia*, in being much stouter in all its parts; in the third joint of the antennæ being nearly as long as the two next together, and in the four terminal joints being shorter and broader; the apex of each elytron is obliquely emarginate within; in *D. ithyceroides* there is only a single fascicle at the base on each side, and there is no ochraceous powdery substance on the elytra, the tibiæ are much thickened at the apex, and in both species the middle of the tibiæ is covered with white hairs.

Dicordylus amœnus. *D.* ovatus, purpureo resplendens; capite rostroque lineatim, elytris maculatim ochraceo-pubescentibus; rostro brevi, nigro; antennis rufo-testaceis, fusco-variis; prothorace transversim conico, crebre punctato, quinquevittato; scutello semiorbiculari; elytris depressis, humeris rotundatis, singulis subcarinatis, apice in medio fortiter mucronatis, maculis magnis in seriebus tribus ornatis; corpore infra chalybeato, nitido, ad latera pube ochracea variegato; pedibus parce pilosis, rufo-testaceis, tarsis fuscis. Long. 3½ lin.

Hab. Chili.

This is a somewhat aberrant species.

Agilaus.

(Rhinomacerinæ.)

Rhynchitæ affinis, sed *tibiis* compressis, subfoliaceis; et *pygidio* obtecto.

The remarkable form of the tibiæ essentially differentiates this genus from *Rhynchites*. In other characters, except of the pygidium, it agrees with the description as given by Lacordaire; the granulate surface of the derm, however, is foreign to *Rhyn-*

Omphasus.

(Prionomerinæ.)

...t exsertum, subporrectum. *Rostrum* validiusculum, subcy-...ndricum, paulo arcuatum; *scrobes* præmedianæ, obliquæ. *Oculi* parvi, rotundati, haud approximati. *Antennæ* tenues; *scapo* sensim incrassato, oculum haud attingente; *funiculo* sexarticulato, art. duobus basalibus breviter obconicis, primo crassiore, cæteris transversis; *clava* ovata adnata. *Prothorax* subconicus, antice truncatus, basi bisinuatus. *Scutellum* parvum. *Elytra* oblonga, modice convexa, singulo basi sinuato, humeris calloso-rotundatis. *Pygidium* obtectum. *Pedes* validi, antici majores; *femora* incrassata, subtus dentata; *tibiæ* anticæ arcuatæ, apice extus unco valido armatæ; *tibiæ* intermediæ et posticæ rectæ, illæ uncinatæ; *tarsi* art. basali elongato-triangulari, secundo parvo transverso, tertio peramplo, profunde bilobo, ultimo elongato; *unguiculi* liberi, singulo dente triangulari munito. *Metasternum* sat elongatum. *Epimera* metathoracis angusta. *Abdomen* segmentis subæqualibus, tribus intermediis ad latera angulatis.

The genera of the *Prionomerinæ* have hitherto been supposed to be confined to America; but this genus, and the following, discovered by Mr. Wallace, rendered it probable that many more species may yet be found in the Malayan archipelago. It is differentiated from the ordinary members of the subfamily in its nearly porrect head, the oblique scrobes, the six-jointed funicle, and the non-approximation of the eyes; in habit it is like some species of *Magdalis*, Germ. (The artist has unfortunately drawn the outline of the head in a vertical position.)

Omphasus æratus. (Pl. VII. fig. 12.) *O.* oblongus, fusco-æneus,

dividing the genus as it
sented in the Papuan
Australia it is all but un
West and from South
another, described furth
probably indicate the n

ALCIDES FASTUOSUS.
dide silacea sparse ves
dio basali squamoso,
mote setulosis; funi
cæteris brevibus, sub
subconico, utrinque pa
quadrato albo-squamo
latitudine vix duplo l
oblongo-quadratis, int
apicem apiceque albido-squamosis; corpore infra pedibusque sparse griseo-squamosis, granulatis; tibiis anticis dente parvo, reliquis intus subbisinuatis. Long. 8 lin.

Hab. Sarawak.

A very distinct species, the declivity of the elytra not marked with a callosity as in most others of this genus.

ALCIDES AURITUS. (Pl. IX. fig. 11.) *A.* subcylindricus, ater, squamositate sparsa nigra indutus, squamisque albidis plagiatim decoratus; capite verticali, inter oculos fovea profunda impresso; rostro crasso, prothorace breviore, sat crebre punctato, squamis brevissimis albis adsperso; antennis nigris, fere nudis; funiculo articulo basali breviusculo, cæteris transversis; oculis ovalibus; prothorace haud transverso, antice modice angustiore, utrinque rotundato, apice excepto, sat confertim verrucoso-granulato; scutello atro; elytris pone humeros tuberculo conico valido instructis, supra fortiter sulcato-punctatis; corpore infra nigro, albo-plagiato; pedibus squamis filiformibus griseis adspersis; tibiis intus in medio spinoso-dentatis. Long. 5 lin.

Hab. Cochinchina.

This species may be placed near *A. delta*. The coloration is very complicated, as will be seen on the Plate, and is not always exactly the same. The spots on the white patches represent the punctuation.

ALCIDES ZERO. *A.* subcylindricus, ferrugineus, prothorace nigro, utrinque albido-lanuginoso; rostro sat valido, prothorace sesquilongiore, rude confertim punctato; antennis fuscis, funiculo articulis duobus basalibus longioribus, cæteris brevibus, ultimis transversis; clava ampliata; oculis subovatis; prothorace transverso, confertim

funicle. Like some others
united at the base and not
Curculionids could be much

G

(Cry

Caput sphæricum ; *rostrum* l
dianæ, laterales, oculos
articulis duobus basalibus
datim latioribus ; *clava*
thorace liberi. grosse gra
l product
lo produ
apice rotu
e parvo in
angulo in
producto, omnes unco mediocri armatæ ; *tarsi*
æ anticæ distantes. *Prosternum* solum modice
osternum detectum. *Mesosternum* declive. *Ab-*

be regarded as the representative in New Caledonia of the New Zealand *Psepholax*. From that genus it is differentiated, *inter alia*, by its straight scrobes and declivous mesosternum not covering the prosternum. The structure of the intermediate tibiæ is evidently a modification of that of *Psepholax*.

Glechinus talpa. *G.* elliptico-cylindricus, læte fuscus, squamis ochraceis maculatim ornatus ; rostro piceo, subtiliter punctato ; scapo supra versus apicem longe et dense ciliato, funiculo intus parcius ciliato ; clava articulis tribus ultimis valde pubescentibus ; prothorace indistincte punctato, linea media plagisque duabus utrinque ochraceis ; elytris striato-punctatis, interstitiis convexis, maculis ochraceis irregulariter adspersis ; corpore infra sat dense griseo-squamoso ; pedibus squamis minusculis tectis, setulis numerosis interjectis. Long. 3¼ lin.

Hab. New Caledonia.

Deretiosus.

(Cryptorhynchinæ.)

Rostrum gracile, capite duplo longius, subarcuatum, dimidio apicali nudo ; *scrobes* præmedianæ, infra rostrum cito euntes.

Oculi sat magni, laterales. *Antennæ* ante medium rostri insertæ; *scapus* clavatus, oculum vix attingens; *funiculus* 7-articulatus, art. primo crasso, secundo longiore, cæteris in clavam continuatis; *clava* elliptica, obsolete articulata. *Prothorax* transversus, apice productus, lateraliter lobatus, basi bisinuatus, lobis ocularibus productis. *Scutellum* distinctum. *Elytra* prothorace latiora, depressa, inæqualia, parallela, basi trisinuata, postice sensim declivia, humeris prominulis. *Pedes* breves; *femora* infra unidentata; *tibiæ* breves, intus bisinuatæ, unco terminatæ; *tarsi* mediocres, art. tertio lobato, ultimo elongato. *Rima* pectoralis indeterminata, metasterno impingens. *Mesosternum* depressum, antice verticale. *Abdomen* normale, sutura prima arcuata, cæteris haud angulatis.

Like *Bothrobatys* in habit; but from its pectoral canal open at the sides and impinging on the metasternum, the genus must be placed with Lacordaire's "Ithyporides;" but it does not seem to be allied to any of the genera in that group. In general appearance the species described above resembles the Australian *Chimades lanosus*, Pasc.

Deretiosus aridus. (Pl. VIII. fig. 10.) *D.* fusca, squamositate albida omnino dense tecta; rostro ferrugineo, apicem versus nitido, subtiliter punctato; antennis pallide ferrugineis, leviter pubescentibus; prothorace supra fere planato, utrinque lobo ampliato horizontali subdilatato, hoc margine anteriore squamoso-fasciculato; scutello punctiformi, elevato; elytris pone basin elevatis, singulo in medio dorsi longitudinaliter cristato, cristis in duas fere divisis, fasciculisque squamosis coronatis, apicibus paulo productis, conjunctim rotundatis. Long. 4 lin.

Hab. Dorey; Saylee (New Guinea); Ceram.

Mitrephorus capucinus. *M.* oblongus, cylindricus, fuscus, rude griseo-squamosus, capite rostroque squamis majusculis tectis, hoc apice nigro; antennis testaceis; prothorace antice valde producto, apice ipso squamis flavescentibus elongatis dense fimbriato et in modo radiato, etiam infra dense squamoso, supra sejuncte punctato, puncto singulo squama repleto: scutello ochraceo-squamoso; elytris squamis parvis densissime tectis, leviter striato-punctatis, ad latera squamis majusculis nigris parcius adspersis; pedibus dense squamosis, squamis numerosis erectis interjectis; tarsis potius pilosis. Long. 3 lin.

Hab. Brazil.

Mitrephorus albifrons. *M.* oblongus, cylindricus, fuscus, dense griseo-squamosus; capite antice niveo-squamoso; antennis subtestaceis; prothorace apice ultra caput vix producto, squamis elongatis sparse adspersis, in medio fasciculis duobus fuscis instructo; scutello concolori; elytris striato-punctatis, interstitiis alternis elevatis, squamis erectis uniseriatim munitis; pedibus rufo-brunneis, dense squamosis, squamis erectis interjectis. Long. 2 lin.

Hab. Brazil.

M. Waterhousei, the only other species, is a larger insect, and covered with a very dense greyish crust.

Perichius.

Rostrum robustum, reticulato-punctatum, punctis squamigeris, apice paulo dilatatum; *scrobes* subterminales, laterales. *Scapus* compressus, oculum attingens; *funiculus* 1-articulatus, art. primo longiore, secundo breviusculo; *clava* anguste ovata, adnata. *Oculi* grosse granulati. *Prothorax* amplus, supra convexus, antice tubulatus, lobis ocularibus angustis. *Scutellum* nullum. *Elytra* late ovata, convexa, humeris obsoletis. *Pedes* modice elongati; *femora* sublinearia, mutica; *tibiæ* flexuosæ, æquilatæ; *tarsi* mediocres, art. tertio late bilobo. *Rima pectoralis* pone coxas anticas limitata, apice cavernosa*. *Episterna* metathoracis obtecta. *Abdomen* normale; *sutura* prima arcuato-angulata.

Allied to the South-American genus *Tylodes*, Schön. (and in habit like *T. tuberculatus*), but differentiated by the scrobes, sculpture of the rostrum, and form of the tibiæ.

Perichius verrucosus. (Pl. VIII. fig. 9.) *P.* ovatus, niger, omnino sat dense ochraceo-squamosus, supra granulis nitidis setigeris dispersis; rostro capite duplo longiore, fusco opaco, ad latera densius squamoso, apice paulo spatulato; antennis ferrugineis, funiculo haud pubescente, parce setoso, art. quinque ultimis subquadratis, clava art. basali cæteris conjunctim longiore; prothorace inæquali, antice fortiter tubulato, utrinque ampliato-rotundato, basi angustiore, parte anteriore haud granulato sed squamis elongatis sat dense vestito; elytris prothorace basi haud latioribus, deinde paulo ampliatis, utrinque rotundatis, supra seriatim subfoveatis, interstitiis granulatis, alternis interrupte elevatis, apice rotundatis; pedibus sat dense setosulis. Long. 5½ lin.

Hab. Waigiou.

* This term is intended to include that form of the pectoral canal in which the apex is covered by the raised margin of the mesosternum, whether the margin be vaulted or semicircular—the converse of when it is exposed (*aperta*).

EREBACES.

Rostrum tenue, apice paulo dilatatum, dimidio apicali nudum, nitidum; *scrobes* medianæ, laterales. *Scapus* oculum haud attingens; *funiculus* 7-articulatus, art. duobus basalibus longiusculis, primo breviore; *clava* breviter ovata, adnata. *Oculi* majusculi, tenuiter granulati. *Prothorax* apice paulo productus, supra subplanus, lateraliter compressus, lobis ocularibus angustis. *Elytra* prothorace arcte applicata, supra planata, postice declivia, pone humeros angulato-producta. *Pedes* elongati; *femora* linearia; *tibiæ* rectæ, æquilatæ; *tarsi* subelongati, art. tertio late bilobo. *Rima* pectoralis inter coxas intermedias protensa, apice aperta. *Episterna* metathoracis angusta, distincta. *Abdomen* segmento secundo breviusculo, duobus sequentibus conjunctim vix æquali; *sutura* prima recta.

The two species composing this genus are quite distinct in habit, owing to the peculiar shape of the elytra, from any other *Tragopus*-form, although, in some respects, a little like *Hexymus*, but differing in their finely facetted eyes and pectoral canal open at the apex.

Erebaces angulatus. (Pl. VIII. fig. 8.) *E.* oblongus, niger, omnino silaceo-squamosus; rostro ferrugineo, vage punctulato; antennis ferrugineis, funiculo clavaque pubescentibus, illo parce nigrosetoso; prothorace subquadrato, antice constricto, supra remote punctato, punctis squamigeris, in medio tuberculis duobus obsito, angulis posticis productis, rotundatis; scutello distincto; elytris quadrato-cordatis, vage nitide granulatis, supra seriatim foveatis, singulatim tuberculo basali elevato oblongo, altero postico multo majore, tertioque minore laterali, instructis, angulo humerali producto, nigromarginato, apicibus rotundatis; pedibus sat dense setosulis. Long. 5½ lin.

Hab. Batchian.

Erebaces pleuricausta. *E.* oblongus, piceus, supra dense silaceo-, infra pedibusque fusco-squamosus; rostro ferrugineo vage punctulato; antennis piceis, funiculo clavaque ut in *E. angulato*; prothorace suboblongo, utrinque antice rotundato, postice parallelo, supra fusco-marginato, punctis remotis, squamis repletis, impresso; scutello obsoleto; elytris subcordatis, striato-punctatis, interstitiis latis, prope suturam uniseriatim granulatis, angulo humerali producto, fere obsolete nigro-marginato, apicibus rotundatis, in singulo elytro tuberculo basali oblongo, altero postico majore, tertioque laterali instructo; pedibus sat dense setosulis. Long. 5 lin.

Hab. Morty.

Hexymus.

(Cryptorhynchinæ.)

Rostrum modice tenuatum, arcuatum, dimidio apicali nudo, nitido; *scrobes* laterales; *antennæ* medio rostri insertæ; *scapo* longiusculo; *funiculo* 7-articulato, art. duobus basalibus elongatis, tertio obconico, cæteris ovatis; *clava* ovali. *Oculi* grosse granulati. *Prothorax* transversus, apice valde angustior, utrinque rotundatus. *Elytra* subquadrata, apice declivia. *Femora* modice incrassata, infra dente angulato armata; *tibiæ* flexuosæ, apice tenuiores, uncinatæ; *tarsi* art. tertio angusto, bilobo. *Rima* pectoralis inter coxas intermedias protensa, apice cavernosa. *Episterna* metathoracis angusta, distincta. *Abdomen* normale; *sutura* prima recta.

This is one of those genera which, without any strong characters, must be constituted partly on account of their peculiar habit, and partly because their characters collectively are not in accord with those of any other genus. It is apparently allied to *Poropterus*, although the metathoric episterna are very large.

Hexymus tuberosus. (Pl. VII. fig. 3.) *H.* oblongus, fuscus, indumento griseo dense omnino tectus, squamisque subsilaceis adspersus: capite fronte convexo, inter oculos foveato; rostro capite plus duplo longiore, subtenui, apice depresso, fusco, extrorsum subtilissime punctulato, basi rugoso-squamoso; antennis ferrugineis; funiculo art. duobus basalibus primo plus duplo longiore, cæteris modice elongatis, ultimo obconico, clavæ subadnato; prothorace transverso, utrinque rotundato, antice constricto, apice producto, lobis ocularibus subangustis, supra pone medium bicalloso, ad apicem crista cariniformi munito; scutello distincto; elytris basi prothorace latioribus, subcompressis, lateribus parallelis, postice declivibus, supra seriatim granulatis, singulo callis oblongis quatuor bene determinatis notato—duobus discoideis ad suturam approximantibus, duobus lateralibus, quorum postico in declivitate sito: pedibus squamis elongatis magis dispersis. Long. 4 lin.

Hab. Queensland.

The following species of *Poropterus* may be taken as fairly congeneric with the four described by Mr. Waterhouse in the 'Transactions of the Entomological Society' (ser. 2, ii. pp. 196–200); but they do not seem to range very satisfactorily in the genus when we consider it has *P. antiquus* for its type. I have yet some twenty approximate species; and until they are worked

5½ lin.

Hab. Tasmania.

Like *P. verres* in the next section, but the tubercles less prominent and more numerous on the elytra.

Poropterus flexuosus. *P.* subovatus, fuscus, squamositate squamulisque griseis tectus; capite inter oculos fovea profunda impresso; rostro rugoso-punctato, basi tricarinato; oculis tenuiter granulatis; antennis piceis, art. secundo primo sesquilongiore; prothorace suboblongo, utrinque rotundato, apice paulo producto, late rotundato, lateribus antice fortiter arcuato-sulcato, supra plicato in medio longitudinaliter tricarinato; elytris ovatis, in medio prothorace latioribus, apicem versus productis, apicibus mucronatis, supra reticulato-foveatis, singulo carinis tribus curvatis notato; pedibus setis majusculis vestitis. Long. 5 lin.

Hab. South Australia (Adelaide).

Poropterus mastoideus. *P.* ovatus, niger, opacus, squamulis griseis omnino sat dense tectus, supra granulis nitidis minutis numerosis dispersis; capite inter oculos longitudinaliter sulcato-foveato; rostro valido, subconfertum punctato, punctis squamigeris; oculis

tenuiter granulatis; antennis piceis, funiculo art. secundo primo manifeste longiore, clava ovali; prothorace oblongo, antice constricto, supra parum convexo, pone apicem excavato, in medio tuberculis tribus instructo, uno elongato anteriore, duobus rotundatis posterioribus transversim sitis; elytris breviter ovatis, tenuiter seriatim punctatis, interstitiis planatis, humeris vix productis, apice rotundatis, singulis triseriatim tuberculatis—serie interiore e tuberculis tribus distantibus alte elevatis, exteriore e quatuor validis, intermedio unico parvo, compositis; pedibus breviter setosulis. Long. 6 lin.

Hab. Batchian.

Poropterus approximatus. *P.* præcedenti affinis sed valde distinctus; *differt* rostro rugoso, irregulariter punctato, clava magis elongata; interstitiis elytrorum elevatis, serie interiore tuberculorum quinque, approximatis, minus elevatis, tuberculo secundo parvo, serie exteriore e tuberculis variis, nonnullis fere obsoletis, compositis. Long. 7 lin.

Hab. Kaioa.

In this species the tubercles of the exterior row are irregular in size, and not well limited. This and the last are somewhat different in habit from any of the Australian species.

Section II. *First and second joints of the funicle equal in length, or the first a little longer.*

Poropterus hariolus. (Pl. VII. fig. 7.) *P.* elongato-ovatus, niger, subsilaceo-squamosus; rostro valido; antennis piceis, scapo oculum vix attingente, funiculo art. duobus basalibus fere æqualibus; oculis tenuiter granulatis; prothorace vage granulato, longe ante apicem subito constricto, tum fortiter tuberculato-producto, postice sensim angustiore, basi incurvato, supra in medio valde excavato, tuberculis duobus transversim obsitis; scutello distincto; elytris prothorace paulo latioribus, compressis, fortiter punctatis, postice sensim declivibus, granulis subnitidis subseriatim adspersis, singulatim tuberculis conicis validis in seriebus duabus instructis, exteriore e tribus, interiore e quatuor majoribus, quorum tuberculo postico validiore, compositis, apicibus tuberculis duobus minusculis terminatis; corpore infra pedibusque subvage squamosis. Long. 7–8 lin.

Hab. Queensland.

Differs from *P. Westwoodii*, Waterh., *inter alia*, in having the apex of each elytron bituberculate.

Poropterus sphacelatus. *P.* sat anguste ovatus, niger, squamis subsilaceis, plerumque erectis, vestitus; capite inter oculos fovea triangulari impresso; rostro valido, squamis erectis adsperso; antennis piceis, funiculo art. duobus basalibus fere æqualibus; oculis fortiter gra-

elongato-punctatis, apicibus truncato, extus paulo angulatis, singulo tuberculis octo, seriebus duabus, munito, sex majoribus, in singula serie tribus, et duobus minoribus in parte declivi sitis, granulisque nigris nitidis validis prope scutellum sitis; pedibus setuloso-squamosis; tibiis fere rectis. Long. 7 lin.

Hab. Queensland.

Allied to the last, but unicolorous, the prothorax proportionally broader, and the first joint of the funicle perceptibly longer than the second.

DIATASSA.

(Cryptorhynchinæ.)

Rostrum tenue, elongatum, arcuatum, basi excepta, nudum; *scrobes* medianæ, laterales, oculos attingentes. *Antennæ* graciles; *funiculus* 7-articulatus, articulis quatuor basalibus longioribus, tribus ultimis brevioribus; *clava* distincta, anguste ovata. *Oculi* laterales, grosse granulati. *Prothorax* subconicus, apice paulo productus, lobis ocularibus prominulis. *Elytra* prothorace latiora, oblongo-cordata. *Femora* elongata, subpedunculata, apicem versus valde incrassata, infra dente valido

armata, postice corpus superantia; *tibiæ* teretes, subarcuatæ; *tarsi* longiusculi, articulo tertio parum dilatato. *Rima* pectoralis inter coxas intermedias protensa, apice cavernosa. *Metasternum* elongatum. *Abdomen* normale.

The form of the femora is eminently distinctive of this genus. I place it after *Oyamobolus*, Schön.

DIATASSA PHALERATA. (Pl. IX. fig. 2.) *D.* ovata, nigra, opaca, squamis fuscis vestita, lineisque supra dense silaceo-squamosis ornata; capite antice dense subsilaceo-squamoso, inter oculos fovea profunda impresso; rostro piceo, basi oblongo-punctato; antennis subferrugineis, funiculo articulis quatuor basalibus fere æqualibus; prothorace latitudine longitudini æquali, rude squamoso, dorso lineis silaceis, tribus longitudinalibus, una pone medium transversa, decorato; scutello silaceo-squamoso; elytris remote seriatim punctatis, punctis basi majoribus, apicem versus gradatim minoribus, linea suturali, alteraque submediana, antice angulata, tertiaque postice ad latera silaceis; corpore infra squamulis parvis sparse irrorato; pedibus dense silaceo-squamosis; clava femorum fusco-lavata. Long. 5 lin.

Hab. Mysol.

PERISSOPS.

(Cryptorhynchinæ.)

Rostrum validiusculum, subarcuatum, basi squamosum; *scrobes* medianæ, laterales, rectæ. *Scapus* oculum attingens; *funiculus* articulis duobus basalibus longiusculis, quinque ultimis moniliformibus; *clava* oblongo-ovalis, velutina. *Oculi* subgrosse granulati, antice perparum approximantes. *Prothorax* conicus, utrinque paulo rotundatus, basi bisinuatus, lobis ocularibus distinctis. *Scutellum* punctiforme. *Elytra* ovata, convexa, humeris rotundatis. *Pedes* breviusculi; *femora* incrassata, antica obsolete dentata, vel dente parvo instructa; *tibiæ* compressæ, subarcuatæ; *tarsi* vix elongati, normales. *Rima* pectoralis pone coxas anticas terminata, apice cavernosa. *Metasternum* modice elongatum. *Abdomen* normale.

The type of this genus has long been known in collections under the name of *Perissops lynx* (Jekel), but was first published in the 'Novara Voyage,' by Redtenbacher, who referred it to *Enteles* (*E. ocellatus*, Redbr.). *Enteles* differs from *Perissops* in many of the characters given above, notably in its longer slender rostrum, with the pectoral canal open at the apex, and extending

longo-ovata, distincta, quadriarticulata, articulis duobus intermediis longitudine fere æqualibus, basali longiore, ultimo brevissimo; oculis antice approximatis; prothorace basi paulo latiore quam longiore, antice fusco; scutello nigro; elytris ovatis, subtiliter striato-punctatis, utrinque in medio plaga maxima fusca, aliquando pallide marginata, decoratis; femoribus, præsertim anticis, dente acuto instructis. Long. 3½ lin.

Hab. Gilolo; Dorey; Aru; Mysol.

Orochlesis.

(Cryptorhynchinæ.)

Rostrum breviusculum, vix vel parum arcuatum, basi latius, apicem versus gradatim angustius, denudatum; *scrobes* fere medianæ, subobliquæ. *Scapus* oculum vix attingens; *funiculus* brevis, articulo basali crassiore, cæteris gradatim incrassatis, quinque ultimis transversis; *clava* breviter ovata. *Oculi* grosse granulati, antice paulo approximantes. *Prothorax* transversus, antice valde angustus, utrinque rotundatus, apice vix productus, lobis ocularibus nullis. *Scutellum* rotundatum. *Elytra* bre-

viter ovata, convexa, prothorace haud latiora. *Pedes* breves; *femora* valida, compressa, infra canaliculata, mutica; *tibiæ* arcuatæ, sulcatæ; *tarsi* normales. *Rima* pectoralis pone coxas anticas terminata, apice cavernosa. *Metasternum* breve. *Abdomen* segmentis duobus basalibus valde ampliatis.

Allied to the preceding, but with a shorter rostrum, the prothorax at the base as broad as the elytra, the femora grooved for the reception of the tibiæ, and the two basal segments of the abdomen unusually large.

Orochlesis annularis. (Pl. VIII. fig. 2.) *O.* ovata, picea, squamis griseis plerumque sat dense tecta; rostro fere recto, dimidio apicali nitido, vage punctulato; antennis testaceis; prothorace longitudine sesquilatiore, squamis pallidioribus variegato; scutello nigro, nitido; elytris striato-punctatis, punctis singulis squamam niveam gerentibus, apice rotundatis, plaga communi orbiculari, saturate vinosa, albido-marginata, postice ornatis; corpore infra fortiter punctato, punctis unisquamigeris; pedibus vage squamosis. Long. 1¾–2¼ lin.

Hab. Dorey; Batchian; Penang.

The spot on the elytra has a dark claret-brown hue, is free from scales, and has, although opaque, a somewhat velvety appearance. The specimens from Penang, taken by Mr. Lamb, do not differ from the Dorey insect which I have selected as the type.

Orochlesis solea. *O.* ovata, nigra, squamosa; rostro parum arcuato, piceo, subtilissime punctulato; antennis testaceis; oculis magis approximatis; prothorace fortiter reticulato-punctato, punctis singulis squamam magnam ochraceam oblongam gerentibus, apice utrinque macula niveo-squamosa ornato; scutello nigro, nitido; elytris striato-punctatis, punctis oblongis, unisquamigeris, interstitiis pallide silaceo-squamosis, nigro-maculatis, in singulo elytro maculis duabus niveis, una subbasali, altera exteriore, sitis; corpore infra fortiter punctato, segmentis tertio quartoque abdominis exceptis, punctis unisquamigeris; pedibus piceis, vage squamosis. Long. 1⅔ lin.

Hab. Batchian.

Orochlesis plesina. *O.* ovata, nigra, squamosa; rostro paulo arcuato, piceo, vage punctulato; antennis subtestaceis; prothorace fortiter reticulato-punctato, inmedio punctis singulis squamam parvam concolorem gerentibus, ad latera squamis majoribus instructo; scutello nigro, nitido; elytris striato-punctatis, punctis ovatis, unisquamigeris, pallide silaceis, plaga magna laterali, altera in utroque elytro prope apicem, alteraque communi ante medium, maculisque paucis

rance, owing to the outline, but they conform to the above formula. The genus is allied to *Chætectetorus*, Schön.

APRIES EREMITA. (Pl. IX. fig. 6.) *A.* oblongus, squamositate grisea ubique densissime tectus, supra pedibusque squamis elongatis erectis interjectis; capite antice profunde excavato, inter oculos gibboso; rostro in medio sat subito arcuato, apicem versus paulo latiore, basi longitudinaliter sulcato; antennis subtestaceis; prothorace postice parallelo, supra fortiter trisulcato, interstitiis duobus validis tuberculisque fasciculatis quatuor munitis, 2 apicalibus, 2 medianis, tuberculo minore utrinque in medio notato; elytris subcylindricis, striato-punctatis, punctis linearibus, interstitiis angulato-convexis, alternis magis elevatis, sparse fasciculatis, fasciculis plurimis, præsertim interstitio tertio et parte declivi squama elongata instructis; abdomine segmentis duobus basalibus vage punctato-impressis. Long. 5 lin.

Hab. Batchian.

APRIES PALLIATUS. *A.* breviusculus, subovatus, squamis vel squamositate sordide grisea, dorso umbrino excepto, ubique tectus; capite antice haud excavato, rostro longiusculo, apicem versus gradatim

latiore; antennis subtestaceis; prothorace tuberculis plurimis tecto, utrinque quatuor, parvis, supra sex majoribus, totis plus minusve fasciculatis; elytris utrinque parum rotundatis, striato-punctatis, punctis subrotundatis, interstitiis vix convexis, inæqualiter tuberculatis, tuberculis plurimis squama spiniformi instructis, basi duobus, uno juxta scutellum, altero humerali, majusculis, rugoso-squamosis. Long. 4 lin.

Hab. Saylee.

The scales of the rostrum and prothorax are, to a certain extent, cup-shaped, giving those parts a peculiar honeycomb appearance; on the elytra there is rather a squamosity than true scales.

Zeugenia.

(Cryptorhynchinæ.)

Rostrum tenue, arcuatum, nudum; *scrobes* præmedianæ, laterales, rectæ, ad oculos desinentes. *Scapus* brevis; *funiculus* 7-articulatus, articulis elongatis; *clava* valida, distincta, obsolete articulata. *Oculi* sat magni, grosse granulati. *Prothorax* transversus, antice valde angustior, lobis ocularibus nullis. *Scutellum* punctiforme. *Elytra* obovata, prothorace vix latiora. *Pedes* breviusculi; *femora* compressa, incrassata, infra canaliculata, dente parvo instructa; *tibiæ* arcuatæ, sulcatæ; *tarsi* normales. *Rima* pectoralis inter coxas intermedias protensa, apice cavernosa. *Abdomen* segmentis tribus intermediis æqualibus.

This genus has the habit of *Chætectetorus*, only broader, and at once differentiated by the three intermediate segments of the abdomen being of equal length. The three species here described are marked on the forehead with a well-defined snowy spot, which is distinctly three-lobed above.

Zeugenia histrio. (Pl. VIII. fig. 11.) *Z.* sat late ovata, nigra, squamis plerumque vage tecta; capite supra oculos dense albido-squamoso; rostro piceo, nitido, subtiliter punctulato; antennis ferrugineis, nitidis; funiculo art. duobus basalibus longioribus, longitudine æqualibus, primo crassiore, tertio quartoque obovatis, gradatim brevioribus, tribus ultimis ovatis; clava ovali, dense pubescente; prothorace valde transverso, silaceo, antice nigro, basi maculis tribus, intermedia majore triangulari, albis ornato, fasciculis sex nigris notatis—2 apicalibus, 4 ante medium transversim sitis; scutello orbiculari; elytris a basi gradatim angustioribus, apice obtuse rotundatis, fortiter striato-punctatis, supra obscure ochraceis, nigro-fasci-

Scapus elongatus, oculum attingens; *funiculus* (♂) art. quatuor basalibus longiusculis; *clava* in utroque sexu elongata, subcylindrica, attenuata. *Oculi* magni, antice approximantes. *Prothorax* conicus, apice paulo productus, basi bisinuatus. *Elytra* subovata, prothorace basi haud latiora. *Pedes* elongati, antici longiores; *femora* vix incrassata, infra dente parvo armata; *tibiæ* paulo arcuatæ; *tarsi* art. basali cæteris conjunctim longiore, tertio late bilobo. *Rima* pectoralis apice subaperta, marginata. *Abdomen* segmento secundo breviusculo. *Processus* intercoxalis latus, antice obtuse angulatus.

The female of *E. vipio* is stouter, with shorter legs and thicker femora than the male; the rostrum also is shorter and stouter at the base, and the tibiæ shorter and nearly straight. In the male the funicle is scarcely a third longer than the club, while in the female this proportion is exactly reversed. I have the female of another species from Macassar.

Endymia vipio. (Pl. VIII. fig. 5, ♂.) *E.* (♂) subelliptica, nigra, nitida, squamis silaceis albo fuscoque variis sat dense tecta; rostro capite quadruplo longiore, piceo, æquilato; antennis ferrugineis; funiculo art. secundo longiore, primo tertioque æqualibus, quarto præcedenti paulo breviore, tribus ultimis oblongis; clava dense griseo-tomentosa, art. tribus basalibus apice obliquis; prothorace latitudine paulo longiore, basi paulo depresso et subdenudato, vage punctato; scutello nigro, rotundato; elytris pone basin latioribus, apice rotundatis, supra striato-punctatis, punctis haud approximatis, singulis squamam albidam gerentibus, interstitiis angustis, valde convexis, uniseriatim vage granulatis; corpore infra pedibusque sparse albido-squamosis; tarsis subtus longe flavescenti-pilosis. Long. 4½ lin.

Hab. Batchian; Dorey.

Panopides.

(Cryptorhynchinæ.)

Rostrum modice tenuatum, basi crassiore, apice latiore; *scrobes* medianæ, obliquæ. *Scapus* oculum haud attingens; *funiculus* art. tertio longiusculo. *Prothorax* oblongus, apice paulo productus, basi truncatus; *clava* ovata. *Elytra* subcylindrica, prothorace haud latiora. *Pedes* elongati, tenuati; *tibiæ* rectæ; *tarsi* art. basali elongato, tertio brevi, late bilobo. *Rima* pectoralis apice aperta. *Abdomen* segmentis basalibus modice ampliatis. *Processus* intercoxalis latus, antice obtuse angulatus.

A very marked form, owing partly to the length and slender-

chus lapathi. Besides the two species here described, there are four more in my collection, from Dorey, Mysol, and two from Sarawak respectively.

SYBULUS PECCUARIUS. *S.* ovatus, niger, sat dense silaceo-squamosus, fusco-alboque varius; rostro piceo, nitido, subtiliter punctulato; antennis testaceis; funiculo articulo secundo longiore, primo tertioque æqualibus, 4. 5. gradatim brevioribus, duobus ultimis rotundatis; prothorace fusco-irrorato maculisque quinque albis ornatis—una antice, quatuor in medio transversim sitis, utrinque plagis duabus albis notatis; elytris sulcato-punctatis, nigro-irroratis, singulis maculis duabus albis decoratis, una ante, altera pone medium; corpore infra pedibusque piceis, vage squamosis; femoribus infra bidentatis. Long. 3 lin.

Hab. Batchian.

SYBULUS INCENSUS. *S.* late ovatus, niger, sat dense albido-silaceoque variegatus, supra squamis plurimis elongatis erectis nigris interjectis; rostro piceo, nitido, subtilissime punctulato; antennis subferrugineis; prothorace valde transverso; elytris striato-punctatis, punctis elongatis, unisquamigeris, interstitiis latis, elevatis, e squamis

Hab. Bouru; Ceram.

A prettily variegated species; the grooves of the elytra marked by a very narrow black line.

Syrichius proletarius. *S.* latior, niger, omnino griseo-squamosus; capite inter oculos paulo excavato; rostro ferrugineo, breviore, dimidio apicali remote subtiliter punctato; antennis subtestaceis; prothorace haud granulato, valde transverso, apice manifeste tubulato, squamis in medio depressis, apice liberis; elytris striato-punctatis, punctis unisquamigeris, interstitiis elevatis, rugoso-granulatis; corpore infra squamis ut in prothorace. Long. 3½ lin.

Hab. Matabello; Gilolo.

A broader species than any of the preceding, the elytra but very slightly narrower at the base, the scales on the prothorax and on the underparts somewhat foliaceous, free at the apex, a longitudinal depression, short in the middle, corresponding to the midrib of the leaf.

Syrichius servulus. *S.* praecedenti affinis, sed prothorace vage granulato, squamis normalibus; elytris minus cordatis, punctis striarum

squamis pallidioribus interjectis. Long. 5 lin.
Hab. Sarawak.

Blepiarda voluta. *B.* modice subelliptica, supra pedibusque fusco-picea, griseo-squamosa; rostro æquilato (♂), apicem versus sensim angustiore (♀), fere obsolete carinato, funiculo sparse setosulo-piloso, articulis duobus basalibus æqualibus, primo (♂) curvato; prothorace valde transverso, basi breviter lineatim elevato, dorso tuberculis parvis quatuor munito, duobus apicalibus, duobus in medio transversim sitis; scutello rotundato, pallide subsericeo-squamoso; elytris subovatis, antice parallelis, striato-punctatis, interstitiis interrupte elevatis, vel quodammodo subtuberculatis; corpore infra nigro-piceo, sparse punctato, punctis unisquamigeris. Long. 3½ lin.
Hab. Dorey; Salwatty.

Blepiarda vitiata. *B.* præcedenti similis, sed prothorace minus transverso, supra valde inæquali, tuberculis sex subfasciculatis, duobus apicalibus, quatuor in medio transversim sitis; scutello oblongo, concolori; elytris interstitiis tertio quintoque tuberculatis, utrinque magis fortiter punctatis, postice lateribusque saturate brunneis; corpore infra minus sparse punctato. Long. 3½ lin.
Hab. Aru.

lata. *Oculi* laterales, rotundati, tenuiter granulati. *Prothorax* subconicus, apice productus gibbosus, lobis ocularibus nullis. *Elytra* ampla, prothorace multo latiora, utrinque subparallela, humeris rotundata. *Pedes* breves; *femora* incrassata, infra dente instructa; *tibiæ* rectæ, *tarsi* articulis duobus basalibus angustis breviusculis, tertio lato, quarto modice elongato. *Rima* pectoralis inter coxas anticas terminata, apice fornicata. *Metasternum* elongatum. *Abdomen* normale. *Processus* intercoxalis triangularis.

A very distinct genus, for which I am at present unable to suggest any alliance. My specimen is probably a female; the other sex might show that its affinities were with the *Mecistostylus* group.

DIETES ALBO-PICTUS. (Pl. VIII. fig. 6.) *D.* ovatus, squamositate atra, niveo-maculata, dense indutus; capite nigro, supra oculos niveo, fronte profunde longitudinaliter sulcato; rostro utrinque vitta obliqua nivea ornato; antennis piceis; prothorace subtransverso, antice valde constricto, postice utrinque parallelo, gibbo apicali in medio fortiter

ference in the approximation of the intermediate and posterior coxæ, contrasted with their extreme remoteness in *Dinorhopala*, as well as in *Tachygonus*, the only other members of the subfamily.

IXALMA RUFESCENS. (Pl. IX. fig. 1.) *I.* rufo-aurantiaca, pube grisea tenuiter vestita; rostro basi æquilato; antennis testaceis, apicem versus rufis; prothorace subtiliter transversim plicato, supra pone medium leviter arcuato-excavato; scutello triangulari; elytris prothorace duplo latioribus, et fere triplo longioribus, fortiter sulcato-punctatis, interstitiis elevatis, tertio a sutura dente triangulari valido, compresso, in medio munito, in singulo elytro versus apicem callo obtuso sito; tarsis albidis, unguiculis rufis. Long. 2 lin.

Hab. Singapore.

APHYODA.

(Calandrinæ ?)

Caput postice abrupte constrictum; *rostrum* longiusculum, basi cylindricum, capite paulo angustius; *scrobes* obliquæ. *Antennæ*

* First taken near Rangoon; it also occurs in Mr. Wallace's collection from Sarawak.

primo brevi, secundo longiusculo, cæteris brevibus, gradatim latioribus; *clava* subglobosa, spongiosa. *Prothorax* elongatus, apice capite haud latior, antice angustior, basi rotundatus. *Scutellum* parvum. *Elytra* prothorace latiora, latitudine plus duplo longiora. *Pedes* mediocres; *femora* paulo incrassata; *tibiæ* compressæ, apice parum arcuatæ, bicalcaratæ; *tarsi* breves, articulo penultimo minusculo; *unguiculi* liberi, tenues, divergentes. *Coxæ* anticæ sejunctæ. *Abdomen* normale.

This genus is evidently an ally of the preceding, although very distinct. The species described below has a pale yellowish-clayey surface, smooth, with the appearance of being varnished.

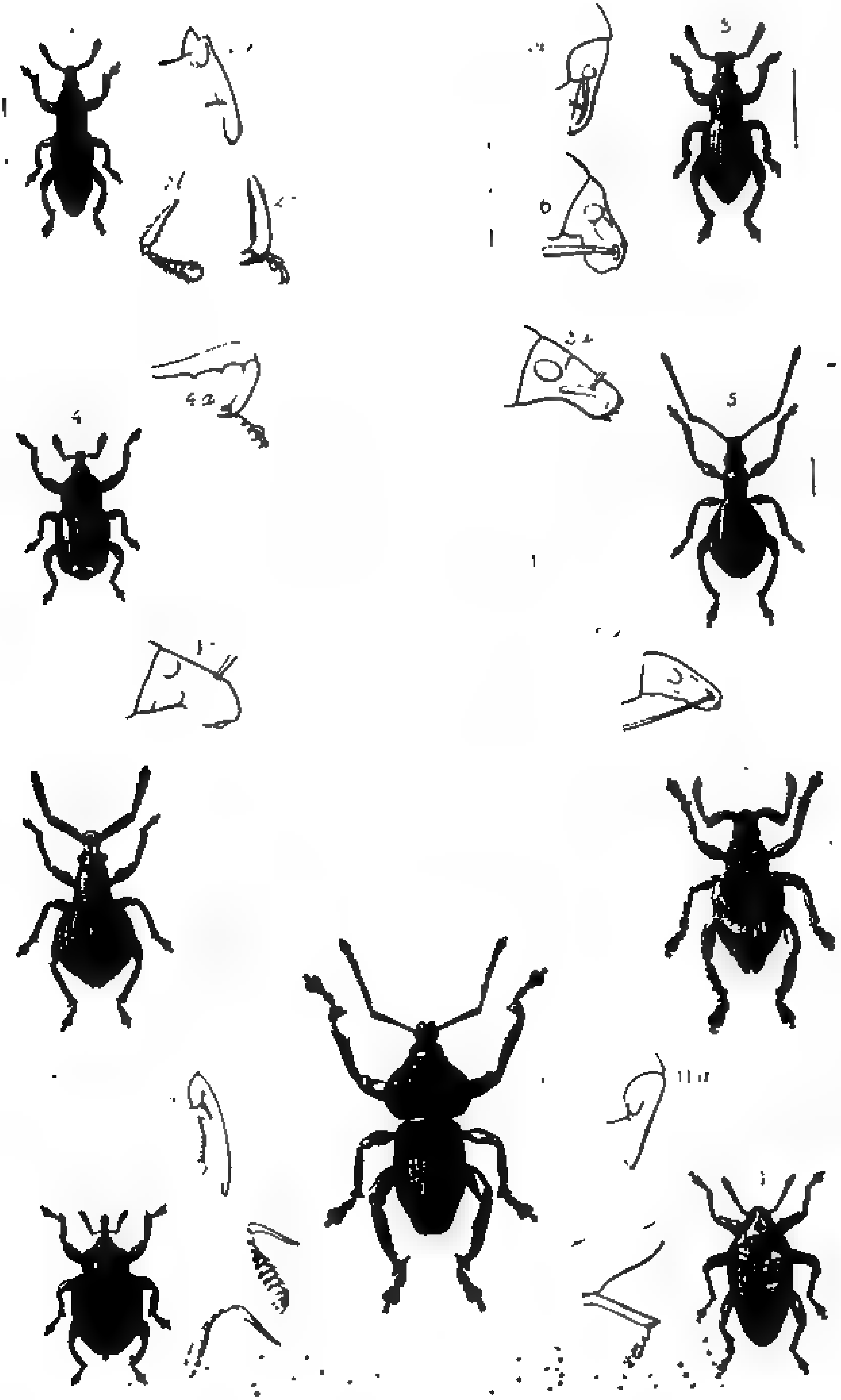
ITHAURA STRANGULATA. (Pl. VI. fig. 2.) *I.* oblonga, depressa, indumento polito lutoso-silaceo omnino tecta; rostro quam prothorace breviore, supra vage subtiliter punctulato; antennis griseo-pubescentibus, parce setosulis; prothorace quam latitudine sesquilongiore, remote subtiliter punctulato, lateraliter vitta obscure fusca angusta notato; elytris subseriatim fortiter impresso-punctatis, basi interstitiis tribus paulo elevatis. Long. 4 lin.

Hab. Columbia.

PROTOCERIUS FERVIDUS. *P.* elongato-ellipticus, supra læte fulvo-brunneus, capite scutelloque saturatioribus, infra pedibusque atris, nitidis; antennis nigris; prothorace oblongo, antice tubulato, basi rotundato, supra glabro, impunctato; scutello elongato-triangulari; elytris prothorace paulo latioribus, postice angustioribus, apice obtuso-rotundatis, singulis striis quinque angustis, duabus extimis abbreviatis lineisque duabus punctatis ad latera insculptis, apice angusto-nigro marginatis; pygidio conico, obscure fulvo-brunneo. Long. 15–19 lin.

Hab. Kumaon.

A narrower species than *P. colossus*, without any granulation on the prothorax, and of a bright yellow cinnamon-brown colour. *P. molossus*, Ol., is a good and perfectly distinct species, the original of which was supposed by M. Guérin Meneville to have been a female *colossus*, to which the head of a male had been attached. I have it from Celebes and Malacca.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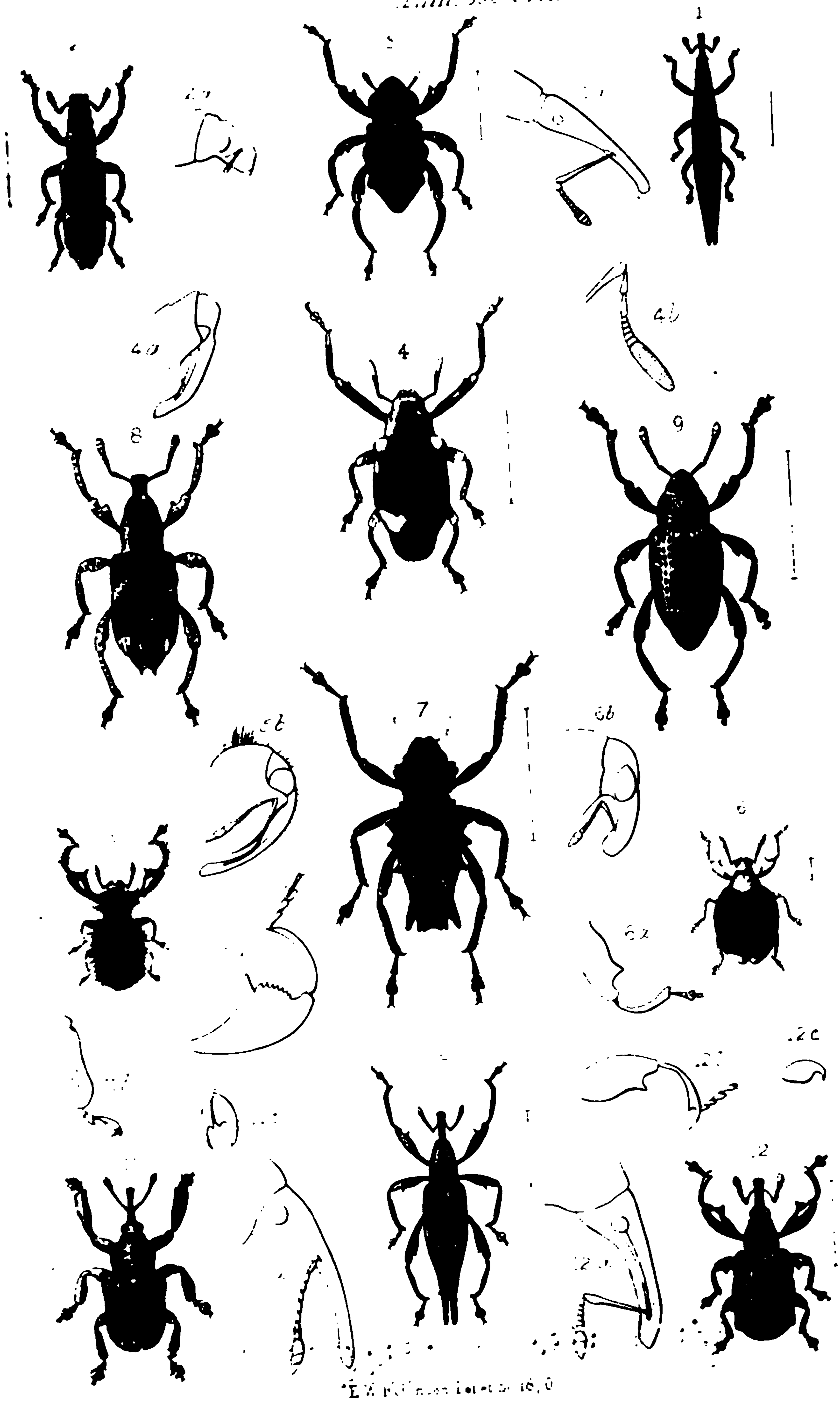
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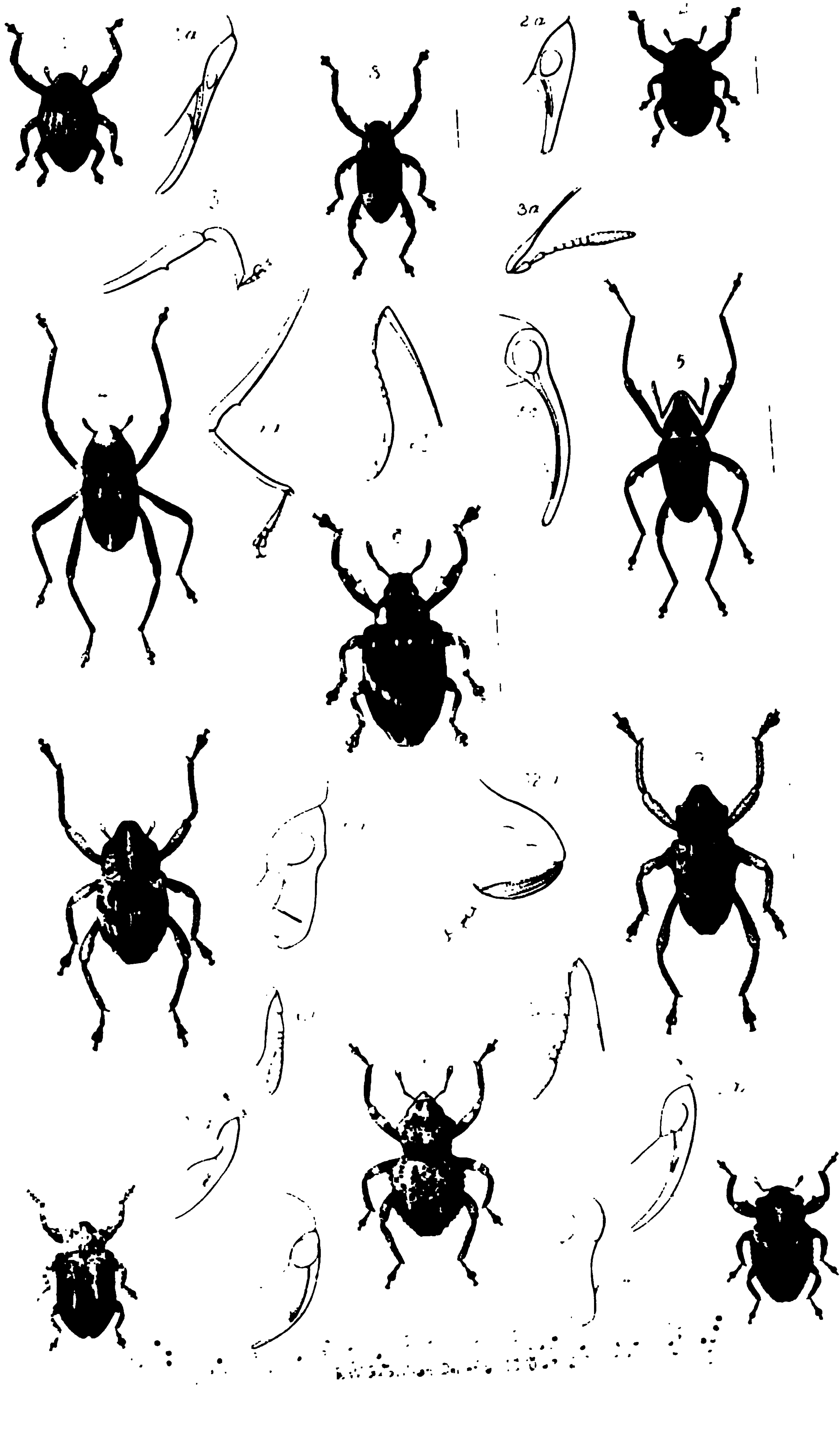

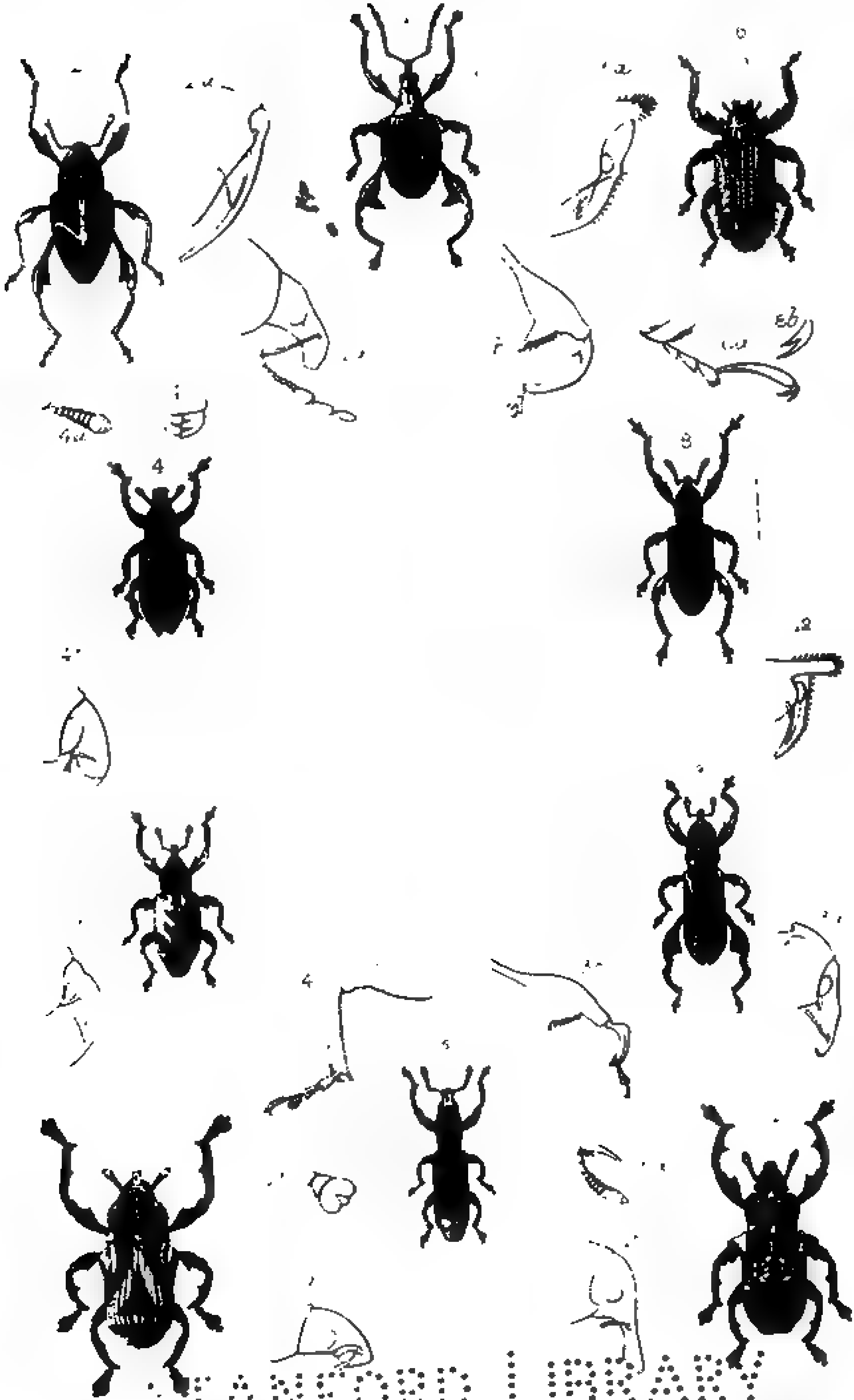

EXPLANATION OF THE PLATES.

Plate VI.

Fig. 1. *Dicordylus pupillatus.*
2. *Ithaura strangulata*; 2 *a*, side view of the head (not sufficiently accurate); 2 *b*, antenna; 2 *c*, fore tibia (the first tarsal joint is hidden by the tibia).
3. *Antinia eupleura*; 3 *a*, lateral view of the head.
4. *Læmosaccus notatus*; 4 *a*, fore leg (unfortunately reversed by the artist).
5. *Mitophorus vittatus*; 5 *a*, lateral view of the head (the dotted lines represent the carinæ mentioned in the type).
6. *Pachyrhynchus argus.*
7. *Bryochæta sufflata.*
8. *Platyomicus pedestris.*
9. *Cherrus Mastersii.*
10. *Tiphaura funerea*; 10 *a*, lateral view of the head and antenna.
11. *Amydala abdominalis*; 11 *a*, lateral view of the head; 11 *b*, left hind leg.
12. Antenna of *Blepiarda neophyta* (♀).
13. Head of *Episomus fimbriatus.*
14. Head of *Oreda*, Wh., n. sp. My specimen is labelled "Madagascar;" but as the genus is only known in New Zealand, I think there must be a mistake, and therefore that is not desirable to publish the species at present.
15. Antenna of *Æsychora notaticollis.*
16. Head of *Siteytes glabratus.*

Plate VII.

Fig. 1. *Aphyoda diura*; 1 *a*, lateral view of the head and antenna.
2. *Dexagia superciliaris*; lateral view of the head.
3. *Hexymus tuberosus.*
4. *Amalthus insignis*; 4 *a*, lateral view of the head; 4 *b*, antennæ.
5. *Ectyrsus villosus*; 5 *a*, fore leg; 5 *b*, lateral view of the head and antenna.
6. *Zeiona pulchella*; 6 *a*, fore leg; 6 *b*, lateral view of the head and antenna.
7. *Poropterus hariolus.*
8. *Scolithus acuminatus.*
9. *Hylobius fasciatus.*
10. *Ectinura brenthoides.*
11. *Agilaus pedestris*; 11 *a*, lateral view of the head and antenna; 11 *b*, fore tibia and tarsus (reversed, the tibia not broad enough); 11 *c*, claws.
12. *Omphasus æratus*; 12 *a*, lateral view of the head and antenna (the head ought to have been drawn nearly horizontal); 12 *b*, fore leg (reversed); 12 *c*, a claw.

4. *Styanax carbonarius*; 4 *a*, antennæ; 4 *b*, lateral view of the head; 4 *c*, mandibles.
5. *Hypermetra analis*; 5 *a*, lateral view of the head.
6. *Apries eremita*; 6 *a*, lateral view of the head and part of prothorax.
7. *Seleuca amicta*; 7 *a*, lateral view of the head.
8. *Niphades pardalotus*; 8 *a*, tarsus and part of tibia; 8 *b*, a claw.
9. *Alcides magister*.
10. *A. delta*, var.
11. *A. auritus*.
12. Head and part of prothorax of *Mitrephorus capucinus*.
13. Tarsus of *Alcides micronychus*.
14. Hind leg of *Nechyrus satyrus*.
15. Head of *Glechinus talpa*; 15 *a*, antennæ.

An Attempt towards a Systematic Classification of the Family *Ascalaphidæ*. By R. M'Lachlan, F.L.S., Sec. Ent. Soc.

[Read May 4, 1871.]

For some years I have been collecting materials with the hope that I might some day publish a monograph of this interesting Neuropterous family; but the difficulty of defining the limits of species, owing to their innate tendency to variation, and the absence, in many cases, of one sex, prove to me the impossibility of, at present, writing an exhaustive work. Collectors generally have paid very little attention to these insects; and without an examination of an extensive series from different localities, a safe generalization on specific forms could not be attempted. I have therefore drawn up the present paper as a sketch of my present knowledge of the family, and as an assistance to myself and others in investigating it.

A glance may here be taken at the progress made in the study of these insects. Linné, at the time of publication of the 12th edition of the 'Systema Naturæ,' knew of only two species, which he placed with *Myrmeleon*. A few years previously, and afterwards, such competent entomologists as Scopoli and the authors of the 'Wiener Verzeichniss,' deceived by external form, described two of the gay-coloured South-European species as Papilios.

The genus *Ascalaphus*, which is synonymous with the family as it now stands, was instituted by Fabricius in his 'Systema Entomologiæ,' in 1776, and at the time of publication of the second volume of the 'Entomologia Systematica,' in 1793, he indicated six species, and one more in his 'Supplement' in 1798.

For a long time the progress was scarcely evident. Burmeister, in 1839, in his 'Handbuch der Entomologie,' enumerates only eighteen species as then known to him. In this work is what was probably the first attempt at dividing the old genus *Ascalaphus* into sections; and Burmeister in one instance indicates a divisional name (*Haploglenius*), which has since been adopted for a genus.

In 1842, Lefebvre, in Guérin's 'Magasin,' made the first essay at a generic splitting-up of *Ascalaphus*, and divided it into ten genera, under the names *Ptynx*, *Azesia*, *Amœa*, *Theleproctophylla*, *Proctarrelabris*, *Ascalaphus*, *Hybris*, *Acheron*, *Orphne*, and *Suphalasca*. This short paper shows great research and an

intimate knowledge of the structure of the family; but in most cases he grouped many, and often discordant forms as divisions of his genera, without indicating any special generic type; hence I have been compelled to an arbitrary adaptation of his views to the present state of our knowledge, carefully preserving, however, his names, and applying each to some one of the divisions he bracketed together under it.

Lefebvre, in the paper just examined, announced his intention of publishing a monograph of the group. I have every reason to believe that this was really completed in MS., and the illustrations prepared, and that it still exists in the possession of his family; yet, from some cause or other, it was never published, though its writer lived for at least twenty-five years after making known his intention. The fact of its non-publication is much to be deplored.

Also in 1842 appeared the volume of the 'Nouvelles Suites à Buffon,' comprising Rambur's 'Histoire Naturelle des Névroptères. His "Ascalaphides" are divided into nine genera, viz. *Ascalaphus*, *Theleproctophylla*, *Puer*, *Bubo*, *Ulula*, *Cordulecerus*, *Colobopterus*, *Byas*, *Haploglenius* (nec Burm.), and *Azesia*. From the almost simultaneous appearance of Lefebvre's and Rambur's arrangement a risk of confusion ensued; but that this was obviated is proved by the fact that Rambur criticises, and in some respects adopts, Lefebvre's views. Rambur enumerates and describes thirty-one species.

In 1848 Westwood, in the 'Cabinet of Oriental Entomology,' indicated a group under the name *Ogcogaster*.

In 1853 Walker completed the second part of the 'List of Specimens of Neuropterous Insects in the Collection of the British Museum:' including forty-one described in that work as new, he enumerates eighty-one species, placing them all under *Ascalaphus*, but indicating divisions. Like all the other Catalogues by this author, this shows an immense amount of bibliographical research, and as a compilation is very valuable; but, like them also, it proves the author's incapacity for discriminating species or groups; and, as a consequence, many of his names sink as synonyms of his own or previously described species. The descriptions are generally good, often excellent; but there is no appreciation of affinities, and the whole work bears the impress of mechanical effort.

In 1860 Hagen published, in the 'Stettiner entomologische

Zeitung,' a synonymic list of the species of the restricted genus *Ascalaphus*. In 1866 the same author brought forward his 'Hemerobidarum Synopsis Synonymica' in the same publication. His generic synopsis of the family contains no new elements, and is an attempt at grouping the described species under the generic divisions already indicated by Burmeister, Lefebvre, Rambur, and Westwood. As a laborious compilation and index-list of names, this work is invaluable; but I have been unable to adopt the author's views in many cases. It was intended only as a starting-point, and, as such, admirably serves its purpose.

In 1868 Brauer, in the 'Verhandlungen der kais.-königl. zoologisch-botanischen Gesellschaft in Wien,' published his "Verzeichniss der bis jetz bekannten Neuropteren im Sinne Linné's; erster Abschnitt." His arrangement of the family is only an echo of that of Hagen.

My examination of the family has resulted in its division into twenty-seven generic groups, including several forms not hitherto noticed. It may possibly be objected that I have carried subdivision to too great a length. To this I would reply that without doubt a still greater disintegration will become necessary. It must be remembered that a knowledge of almost any Neuropterous family may be considered half a century behind that of the more favoured orders, such as Coleoptera, where subdivision has been carried to great minuteness of distinction. And, for my part, I would decidedly express myself in favour of minute subdivision, rather than of the principle of retaining numerous species under one generic heading. Few, I imagine, now believe in the existence of groups sharply defined by nature, and coequal in value, such as formed the ideals of the older authors; and, granting this, it is to me a far greater aid to memory to have many groups, each with a special name, than to be put to the inconvenience of retaining in memory the characters of multitudinous unnamed sections of one large genus: in the former case the name recalls the characters; in the latter the sections, indicated probably by numbers or signs, mix themselves inextricably.

An attempt to arrange the described species under the new generic divisions, and a recapitulation of twenty-three species diagnosed as new, results in about 103 species now known. The number as catalogued by Walker is much reduced, owing to many

names sinking as synonyms. Many additional, but undescribed, species probably exist in various museums and private collections. I have taken no cognizance of museum or catalogue names without descriptions. The materials from which I have worked are:—(1) the very extensive collection of the British Museum; (2) the valuable collection in the Oxford Museum, especially interesting as containing a considerable portion of Mr. Bates's private Amazonian collections, for an opportunity of consulting which I am indebted to the courtesy of Professor Westwood; (3) the collection of Baron de Selys Longchamps, of Liége, which contains most of Rambur's types; and (4) my own collection.

Geographical Distribution.

The range of the family may be said to extend from between the parallels of 40°–50° N., and 30°–40° S.; but, as a rule, it is more abundantly represented within the tropics. The various generic groups exhibit a decided tendency to localization. In no case is the same group represented both in the Old and New Worlds. I give below an outline of distribution according to groups:—

Mediterranean District.—*Ascalaphus* (extending into Central Europe and Central Asia); *Bubo, Puer, Theleproctophylla.*

Asia.—*Idricerus* (India); *Helicomitus* (India); *Siphlocerus* (India); *Ogcogaster* (India); *Ascalaphodes* (India); *Glyptobasis* (India); *Acheron* (India, China); *Hybris* (India, China, Japan, Malayan archipelago); *Suphalasca* ? (Malay archipelago).

Africa.—*Melambrotus* (South-west); *Tmesibasis* (South-east); *Cormodes* (West); *Helcopteryx* (South); *Proctarrelabris* (South); *Nephoneura* (South); *Encyoposis, Suphalasca,* ?

Australia.—*Suphalasca, Acmonotus.*

America.—*Ulula, Orphne, Colobopterus, Cordulecerus, Haploglenius, Ptynx.*

Habits, &c.

There is probably scarcely any group of insects of equal importance of which less has been recorded in a biological point of view. The numerous class of explorers, more or less disinterested in their intentions, find full occupation in geographical and ethnological subjects, with an occasional notice of some remarkable point in the higher branches of zoology. On the other hand, those travellers who avowedly make the collecting of natural-

history objects their especial business for a pecuniary object, are necessarily devoted principally to those groups that find the most admirers, and are too often compelled, not always willing, panderers to a collecting-mania, in which the biology of the species of the most desiderated orders is scarcely attended to, and that of even the most conspicuous forms in other groups wholly neglected. Hence the records of the earlier stages and habits of the *Ascalaphidæ* are extremely meagre. With regard to the conspicuous species of the European restricted genus *Ascalaphus*, the same remarks will obtain with almost equal force. As is usually the case, those entomologists resident in localities where the insects abound feel the objects too familiar to be worthy of investigation; so that, with one honourable exception, we are almost without records of the habits of species which, from their gaudy appearance, were originally considered Butterflies. Had not this pleasing illusion been dispelled, we should have found hosts of observers, minute in details, and critical to absurdity in their appreciation of the discoveries of their fellow entomologists.

The barely definable line of demarcation between the *Ascalaphidæ* and the more familiar *Myrmeleonidæ*, or Ant-lions, points to similarity of habit, which has been sufficiently proved. The larvæ of the former, however, *never* make pitfalls, which is a frequent custom with those of the latter.

Putting on one side several unimportant and vague remarks on larvæ supposed to belong to the *Ascalaphidæ*, the first detailed account of the habits of a species of this family is given in the 'Trans. Linn. Soc.' vols. xiv. & xv., by that careful observer the Rev. Lansdown Guilding. He described with much care the metamorphoses of a species found in the Island of St. Vincent, in the West Indies, which he named *Ascalaphus Macleayanus*, belonging to Rambur's genus *Ulula*. In vol. xiv. p. 140, he says, "Habitat solitarius, volatu diurno satis frequens in dumetis S[ti] Vincentii; ramulis emortuis sæpe quiescit, hostesque colore fugit." In vol. xv. is an extract from the minute-book relating to the Meeting of June 6, 1826, in which we read at p. 510, "Animal insectivorum ?, sæpe die quiescit in arbustis vetustis emortuis, cum antennis alisque ramo applicatis, abdomineque in angulum (more ramuli) extenso, sic hostes decipiens. Ova numero 64–75 lanceolato-elliptica cinerascentia, apicibus puncto candido in extremitate ramulorum ponit imago; serie duplici alternatim agglutinans et circulis multis repagulorum ab hostibus defendens.

Repagula elongata pedunculata, subdiaphana, rufescentia. Larva —Abdomen ovale, complanatum, scabrum;......pectines utrinque decem atro ciliati, anticis duobus (alarum rudimentis?) curvis." And at p. 511 we are informed that "by the term *repagula* (barriers) Mr. Guilding designates certain attendants on the eggs, which he conceives to be without analogies in the animal creation. They are curiously placed in circles, and always on the extremity of a branch, so that nothing can approach the brood; nor can the young ramble abroad till they have acquired strength to resist the ants and other insect enemies. The female may be seen expelling from her ovary these natural barriers with as much care as her real eggs." Typical examples of the perfect insect are contained in the Oxford Museum, with young larvæ; and I imagine it is one of the latter that Prof. Westwood figures in his 'Introduction,' fig. 68, 20. It is much to be regretted that no one since Guilding's time has described the metamorphoses of American species of the family. The allies of his species are common enough in some parts of America, and a species so closely related as to have been considered identical is found in the Southern States; why, then, does not some American entomologist give us some information respecting the extraordinary barriers by which the eggs &c. are protected? That these are not present in Old-World species is certain, so far as observations have gone. If the barriers also "protect" the larvæ till they have acquired sufficient strength to protect themselves, one is tempted to ask on what these feed in the mean time?

In the 'Verhandlungen der zoologisch-botanischen Gesellschaft in Wien,' for 1854, pp. 463–471, and 1855, pp. 479–482, Herr Brauer, so well known for his biological researches on various *Neuroptera*, records his observations on *Ascalaphus macaronius*, with explanatory figures. According to him, "The perfect insects fly only in the sunshine, very high in the air during calm weather; their flight resembles that of *Zygæna* among the Lepidoptera, but is steadier. In the morning, and in cold rainy weather, they sit on stalks of grass with the wings folded roofwise. They are then difficult to see, because they notice each movement of the observer, and turn slowly round the grass-stem, so that they always maintain the same concealment. The time of flight begins at the end of June, and lasts until the middle of August. Pairing takes place during flight. The male seizes

the female with the appendices of the last segment; and both fall to the ground, and rest on some plant. Their position is then similar to that of the *Noctuidæ* and other Lepidoptera. A few days after pairing the female lays her eggs. These are arranged in two parallel rows, to the number of forty or fifty, on some plant, generally grass. When at large I have observed them to hunt chiefly Lepidoptera and small beetles." The young larvæ scatter themselves little from the position in which they are bred, and grow very slowly until the end of winter (though born in August); they are then very difficult to find, and appear to feed chiefly on *Aphides*, hiding mostly amongst moss and small stones. In the spring they begin to grow more rapidly, and take to larger food; and in June they spin cocoons amongst low herbage, in which they change to pupæ. The larvæ have a process on the sides of each thoracic and abdominal segment, though far less developed than in *Ulula*; and the possession of these processes seems to be one of the best characters whereby to separate the larvæ of the *Ascalaphidæ* from those of *Myrmeleonidæ*, which latter have no processes. In the same Journal for 1867, p. 966, Brauer briefly alludes to a larva of this family from Rockhampton, which, I think, is probably that of a *Suphalasca*. He describes it as having only one long tooth to the mandibles.

I possess the eggs of a species of the family from Saugor, Central India, given to me by Mr. F. Moore, of the India Museum. They are arranged in two or three rows on a dead twig of mulberry, to the number of nearly sixty. These eggs produced larvæ thirteen days after they were discovered. The larva is about 3‴ in length, the head rather broader than long, with two produced eye-bearing tubercles in front, and very deeply concave on its hinder margin, extremely rough; the mandibles with three large teeth and many smaller ones. Each thoracic and abdominal segment has a subcylindrical process on each side furnished with long and strong spines. Neither with these eggs nor with those of *Ascalaphus macaronius* is there any vestige of the *repagula* mentioned by Guilding.

A larva given to me by Mr. Bates, captured by him in the Amazon region, evidently belongs to the family, and may possibly be that of a *Ulula*. It is 6½‴ long, without the mandibles (or 8¾‴ including those members), and nearly 5‴ broad at its broadest part. The mandibles have three equidistant long teeth, between which are very short tubercular teeth. The head is nearly quadrate and sca-

brous, deeply concave behind, the sides denticulate and fringed; the eyes are twelve in number, six on each side, placed on the produced anterior angles of the head. The thoracic and abdominal segments are each furnished with a long, slightly curved, flattened lamina, densely fringed with spines, the first thoracic lamina longer and broader than the others; the abdomen very broad and thin, somewhat transparent in the dry larva, convex above and concave beneath; the legs entirely hidden under it.

In an example of *Proctarrelabris annulicornis*, from Natal, in the British Museum, a note is attached in the handwriting of its captor, Mr. Guienzius, stating that the species hides by day in chinks of the bark of old trees, and at dusk flies about the trees hawking insects. An example of *Idricerus decrepitus*, from North India, in my collection, is ticketed (by Capt. A. M. Lang, R.E., who gave it to me) as having been taken in the twilight.

Mr. Bates, who had ample opportunities of observing these insects when on the Amazons, informs me that the species were most numerous in the dry sandy country of the Tapajos, and much rarer in the humid virgin forests of Pará and the Upper Amazons. Of the *Haploglenii* he says the flight is short but rapid in the shades of the forest in the daytime, the insects reposing with the wings expanded, as in *Libellula* (a most valuable observation), and resting head upwards. Of the *Ululæ* and *Colobopteri* he remarks that they are mostly found in dry woods and dry grassy savannas, resting during the day on twigs of dead trees or bushes, with the wings tectate, as in all genera excepting *Haplogenius*, and head downwards.

In the foregoing notes, I think, is incorporated every biological observation of any importance that has yet been made. Their paucity should stimulate observers to further investigations.

Generic Characters.

Antennæ.—The principal points to be noticed are the comparative lengths, form of the club, presence or absence of serration or denticulation in any portion of them (a character that can only be applied to the ♂; in the ♀ there is never either denticulation or serration), presence or absence of verticillate hairs on the basal portion, and, lastly, whether in the ♂ they are straight or nearly so, or present bendings or twistings of some portion

Eyes.—Whether simple or divided by a groove into two por-

tions, and the comparative size of these portions. The eyes in the Schizophthalmous division are really double, the upper portion overlapping the under; if the upper portion be separated, the lower division looks like a small spherical ordinary eye.

Thorax.—Comparative robustness and amount of villosity.

Abdomen.—Length and disparity of form in the sexes; presence or absence of dorsal humps (for the ♂ only); and especially the presence or absence of anal appendices in the ♂, and, when present, their form.

Legs.—Comparative length and strength, and the length of the tibial spurs, as compared with the basal joints of the tarsi. (In this last character, as given under each genus, it is always the posterior legs that are referred to.)

Wings.—Size and shape, closeness or openness of the network. The base of the inner margin should always be particularly examined. In the anterior wings this portion varies very much: ordinarily there is a simple small excision at the extreme base, with the axillary angle more or less prominent; occasionally, however, the basal part of the inner margin has a long excision, rendering the wings almost petiolate; and frequently proceeding from this portion is a long tooth-like projection, in which case the wings are said to be "appendiculate:" this tooth is, in reality, the axillary angle standing out prominently in consequence of the margin beyond it being scooped out; when present it is always irrespective of sex (*cf.* Hagen in Stett. ent. Zeit. 1866, p. 373). In the posterior wings regard must be had to the outline of the basal portion of the posterior margin: in these wings also a point of structure in the neuration must be especially attended to; I allude to the lower cubitus ("la cinquième nervure" of Rambur); in most genera this nervure, near the base, presents a slight geniculation, from which proceeds an oblique nerve running into the underlying longitudinal nervure (the postcosta); occasionally the indication of this oblique nerve is very slight, and it then is scarcely distinguishable from the ordinary veinlets, only that its point of departure can be detected by the indentation of the cubitus above alluded to; occasionally also the deep excision of the inner margin, and consequent narrowing of the base of the wing, nearly obliterates both the oblique nerve and the postcosta; in a few (American) genera there is no indication whatever of this oblique nerve, and the postcosta is long and sinuous.

With regard to the sequence and affinities of the genera, I believe it to be impossible to rely upon any special characters in the imago alone, and consider that no thoroughly stable arrangement can be arrived at until a knowledge of the earlier stages and general habits can be acquired. One should rely more upon facies in the present crude state of the family as a guide to affinities. An arrangement based upon special characters would tend to widely separate forms which are evidently closely allied one to the other, and would place in juxtaposition those with little relationship. It seems probable that even the obvious character of the entire or divided eyes will eventually be found insufficient to maintain the existence of two divisions, however useful the character may appear at the present time.

I have given no characters derived from an examination of the parts of the mouth, such examination being almost impossible in dry examples.

This appears to be the best place for a discussion of the affinities of the anomalous genus *Stilbopteryx*, Newman (*Azesia*, Lefebvre). Lefebvre placed it unhesitatingly in the *Ascalaphidæ*, and succeeding writers have pretty generally followed him. It should be remarked, however, that the most obvious character, the very short antennæ, was not observed by him, in consequence of these organs being wanting in his type; in his figure he supplied ideal long antennæ, as is usual in the family. Hagen, in 1866 (Stett. Ent. Zeit. p. 372), transferred the genus to the *Myrmeleonidæ*, stating that he did so in consequence (especially) of the character of the reticulation of the poststigmatical area, which is made up of numerous small *oblong* cellules, whereas in the *Ascalaphidæ* these cellules are ordinarily many-angled. I fail to appreciate this character to the extent that my friend Dr. Hagen does, because in some *Ascalaphidæ* (e. g. *Orphne*) there is a decided tendency to this oblong building of the cellules, and, on the other hand, I do not find in any *Myrmeleonidæ* a full equivalent of the cell-structure exhibited in *Stilbopteryx*. The form of the palpi seems certainly more analogous to that of the *Ascalaphidæ* than to most of the *Myrmeleonidæ*; and the facies of the genus reminds one much of some species of *Suphalasca* that inhabit the same districts.

It is, then, with much hesitation that I have omitted *Stilbopteryx* from the *Ascalaphidæ*; that I have done so is solely owing to the formation of the antennæ, which finds no parallel in that

family, believing, nevertheless, that the discovery of the earlier stages will reinstate it in its original position *.

Specific Characters.

The ordinary minor differences in form, and the colours of the various members, should be taken into consideration. As this is not intended as a monograph of species, I shall say little on this subject, save to enjoin caution. I have already remarked that the species appear to vary much according to locality in some cases. How far this variation may entitle the forms to specific right, or only to the minor position of "varieties," cannot be considered with the materials at present in hand. Another very important matter is the coloration of the wings. In many species in which the wings are *tinted*, it is certain that the full amount of coloration is not acquired until after a considerable time, as in many *Libellulidæ*. These insects are probably comparatively long-lived, and the tinting would seem to be the result of a kind of oxidation of the membrane of the wing, that proceeds gradually. Very great caution should be exercised in considering the comparative robustness or obesity of the ♀ abdomen. It is probable that many females live, for the enjoyment of life, for some little time after the ova are deposited; and in these "spent"

* [Since these remarks were written, I have discovered a character which tends to prove that *Stilbopteryx* has really more relationship to the *Myrmelionidæ* than to the *Ascalaphidæ*. At the extreme base of the inner margin of the posterior wings of the male is a corneous semipedunculate knob. This is present in the males of *Palpares*, *Acanthaclisis*, &c., but, I think, is always absent in *Ascalaphidæ*.]

I am not prepared to say how many species of *Stilbopteryx* may exist. All that I have seen seem to pertain to the same species, differing in the spotting of the sides of the abdomen according to sex. All these I refer to *costalis*, in the ♂ of which the abdomen is somewhat geniculate at the fourth segment, and on the dorsum of this segment there is a protuberance covered with short black spines. Dr. Hagen, however (in litt.), believes he has four species. One of these, from Western Australia, is very extraordinary, and has (I presume in the ♂ only) an enormous protuberance on the base of the dorsum of the abdomen, having some analogy to the formation seen in *Acmonotus incusifer*, which latter certainly is of the *Ascalaphidæ*. The "nov. sp. Coll. M'Lachlan," mentioned by Hagen in Stett. Zeit. 1866, p. 460, and stated on the authority of a verbal communication from me to him, some years since, as coming from Java, is probably only *costalis*. I captured it myself, in 1855, on board ship. I can find no note in my journal concerning it, and now think that it must have flown on board off the coast of New South Wales, and not when near the island of Java, as I formerly supposed.

females the abdomen often shrinks to a less size than that of the male, although before oviposition commenced it was of enormous bulk.

I would here explain that in the diagnoses that follow, by the term "*Frons*" I mean the vertical face of the head; "*Vertex*" includes the whole upper surface of the head from the base of the antennæ to the posterior margin; "*Occiput*" refers to the back portion of the head *behind* the eyes. The measurements are in *English lines* (12‴=25 millimetres).

Tabula Generum.

Div. I. Holophthalmi.

(Oculi integri.)

A. Alæ anticæ ad basin appendiculatæ.
  a. Antennæ alis multo breviores.
    b. Alæ anticæ posticæque ad basin perangustatæ, inde sat latæ, dense reticulatæ .... *Ptynx*, Lefebr.
    bb. Alæ anticæ ad basin paullo angustatæ, aperte reticulatæ, (*vide infra*) .... *Haploglenius*, Burm.
    bbb. Alæ perangustatæ..... .... *Melambrotus*, n. g.
  aa. Antennæ alis æquales vel longiores. Alæ variegatæ, ad basin angustatæ, inde dilatatæ.. *Tmesibasis*, n. g.

B. Alæ anticæ haud appendiculatæ.
    c. Alæ, insecto haud volitante, fere horizontaliter extensæ. Prothorax maris supra in valvulam magnam postice productus. Abdomen subgracile. *Haploglenius*, Burm.
    cc. Alæ, insecto haud volitante, longitudinaliter deflexæ. Prothorax maris simplex.
      d. Alæ latæ. Corpus valde robustum, breve. *Cormodes*, n. g.
      dd. Alæ angustiores. Corpus gracilius, longius. *Idricerus*, n. g.

Div. II. Schizophthalmi.

(Oculi divisi.)

A. Ramulus obliquus cubiti inferioris in alis posticis deest; postcosta elongata, sinuata. (Genera Americana.)
  a. Alæ anticæ ad basin appendiculatæ; posticæ maris prope basin valde dilatatæ. Antennæ alis æquales vel longiores. *Orphne*, Lefebr.

aa. Alæ anticæ haud appendiculatæ.

b. Alæ latæ: posticæ ad basin dilatatæ; margine anali plus minusve exciso vel sinuato. Calcaria tibiarum posticarum articulis tarsorum 1° et 2° simul sumptis vix longiora.

Cordulecerus, Ramb.

bb. Alæ plerumque angustiores: margine anali posticarum integro, convexo. Antennæ alis plerumque breviores, clava brevi. Calcaria tibiarum posticarum articulis tarsorum 1°, 2°, 3°que simul sumptis vix longiora.

Ulula, Ramb.

bbb. Alæ elongatæ, angustatæ, posticæ haud dilatatæ; margine anali ante basin plerumque profunde exciso, ad basin dilatato. Antennæ alis æquales vel longiores, ad basin pilis verticillatis plus minusve instructæ; clava angustata, elongata. Calcaria tibiarum posticarum articulis tarsorum 1°, 2°, 3°, 4°que simul sumptis vix longiora.

Colobopterus, Ramb.

B. Ramulus obliquus cubiti inferioris in alis posticis cum postcosta conjunctus (interdum fere obliteratus), hæc brevior.

α. Alæ anticæ ad basin appendiculatæ.

β. Antennæ ad basin pilis verticillatis instructæ.

Nephoneura, n. g.

ββ. Antennæ pilis verticillatis haud instructæ; parte basali maris paullo arcuato, intus denticulato.

Glyptobasis, n. g.

αα. Alæ anticæ haud appendiculatæ.

γ. Antennæ ad basin pilis verticillatis instructæ.

δ. Abdomen maris subgeniculatum, ad apicem lateraliter membranaceo-alatum; appendicibus brevibus, divaricatis .... *Helcopteryx*, n. g.

δδ. Abdomen maris simplex; appendicibus elongatis, forcipatis .... *Proctarrelabris*, Lefebv.

γγ. Antennæ pilis verticillatis haud instructæ.

* Abdomen maris appendicibus instructum.

† Abdomen maris tumore permagno conicali supra ad basin instructum; appendicibus brevibus cylindricis, vix forcipatis. Alæ perangustatæ.

Acmonotus, n. g.

†† Abdomen in utroque sexu simplex.

‡ Appendices elongatæ, forcipatæ, processu intus in medio instructæ.

§ Abdomen fœminæ appendicibus foliaceis instructum .... *Theleproctophylla*, Lefebv.

§§ Abdomen fœminæ appendicibus haud instructum .... *Bubo*, Ramb.

‡‡ Appendices simplices.

1. Antennæ maris ad basin arcuatæ. *Hybris*, Lefebv.
2. Antennæ maris in parte apicali flexuosæ et intus subserratæ. Alæ elongatæ, haud dilatatæ. *Siphlocerus*, n. g.
3. Antennæ maris regulariter paullo curvatæ, intus denticulatæ. Alæ breves, subtriangulares, maris partim opacæ...... *Ascalaphodes*, n. g.
4. Antennæ maris fere rectæ simplices.
   - *a*. Abdomen maris fere glabrum, valde inflatum; appendicibus robustis. Alæ vix dilatatæ. *Encyoposis*, n. g.
   - *aa*. Abdomen maris fere glabrum, subcylindricum; fœminæ valde dilatatum. Alæ paullo dilatatæ, maculatæ .. *Ogcogaster*, Westw.
   - *aaa*. Abdomen breve, hirsutum. Alæ breves, subtriangulares, pictæ, sæpius partim opacæ; margine costali ad basin dilatato. Appendices breves, graciles .. *Ascalaphus*, F.

** Abdomen maris appendicibus haud instructum.

× Antennæ maris in dimidio basali flexuosæ et pilis fasciculatis extus instructæ. Alæ elongatæ. Abdomen fere glabrum .... *Helicomitus*, n. g.

× × Antennæ maris ad basin intus denticulatæ. Alæ elongatæ, dilatatæ. Abdomen maris perelongatum. *Acheron*, Lefebv.

× × × Antennæ maris simplices.

⊙ Alæ elongatæ, subæquales, vix dilatatæ. Abdomen modice elongatum. *Suphalasca*, Lefebv.

⊙⊙ Alæ valde inæquales, subtriangulares. Abdomen breve, lateraliter valde hirsutum. *Puer*, Lefebv.

It is impossible to draw up a table that shall apply intelligibly to both sexes; and as the generic characters depend so greatly upon sexual differences in formation of antennæ, abdomen, &c.,

it is very desirable that the outline characters that follow in the consideration of each genus should be consulted. Tables are matters of great convenience; but if they be in all cases implicitly relied upon for determining genera or species, confusion must ensue.

The exigences of a tabular arrangement have widely separated genera that are closely allied one to the other. The affinities of the various genera may be indicated in the following manner:—

Division HOLOPHTHALMI.—*Haploglenius.* *Ptynx.*————*Melambrotus.*————*Tmesibasis.*————*Cormodes.* *Idricerus.*

Division SCHIZOPHTHALMI.—*Cordulecerus.* *Ulula.*————*Orphne.* *Colobopterus.*————*Acmonotus.* *Suphalasca.*————*Bubo.* *Theleproctophylla.* *Siphlocerus.* *Helicomitus.*————*Encyoposis.* *Ogcogaster.*———— *Glyptobasis.* *Acheron.* *Hybris.* ————*Nephoneura.* *Proctarrelabris.* *Helcopteryx.*————*Puer.* *Ascalaphodes.*————*Ascalaphus.*

Division I. HOLOPHTHALMI.

Genus HAPLOGLENIUS, *Burmeister*.

(*Amœa*, Lefebv.; *Byas*, Ramb.)

Wings extended nearly horizontally in repose, almost as in *Libellula*, but a little elevated; long, and generally rather broad, the basal portion never much narrowed; the anterior pair varying in the formation of the basal portion of the inner margin, which has either a long but slight excision with a rather prominent axillary angle, the same with the angle produced into a broad triangular tooth, or regularly convex with the angle obsolete; network open; pterostigma very large.

Antennæ equalling half the length of the wings, or longer or shorter than the half; club varying, but more or less elongate.

Thorax slightly villose; in the ♂ the prothorax is produced above posteriorly into a valve, which fits over a concave space in the front portion of the mesonotum.

Abdomen moderately long, slender; in the ♂ there is sometimes a pair of minute lateral appendices before the apex.

Legs, with the spurs of the posterior tibiæ scarcely so long as the first two tarsal joints.

Hab. Central and South America.

Much confusion has existed with regard to this genus, which

is a *very* natural one, notwithstanding its variability of character in the wing-formation. The position of the wings in repose is unique in the family, as is also the singular formation of the prothorax in the ♂. Much of this confusion is owing to Rambur and others having wrongly understood Burmeister's species, and confounded one of them with the *Ascalaphus appendiculatus* of Fabricius. The genus *Byas* of Rambur is certainly identical with *Haploglenius*, as is also *Amoea* of Lefebvre.

Species.

The species are without doubt numerous, but their differentiation is very difficult, owing to insufficient materials. The best characters exist in the comparative lengths of the antennæ, and in the formation of the wings, especially with regard to the shape of the basal portion of the inner margin of the posterior pair. The smaller species (*arenosus* and allies) are comparatively much more robust than the larger; and in them the prothoracic valve of the ♂ is less developed, and the hind wings, from the point of termination of the cubiti in the inner margin, become suddenly greatly dilated; and in these the club of the antennæ is less elongate. The males appear to be less numerous than the females, judging from the collective series of examples that have examined.

1. H. COSTATUS, *Burmeister*. (Ascal. costatus, *Burm*. *Handb.* ii. p. 1000.—A. luteus, *Walk. Cat. Brit. Mus. Neurop.* p. 450.—A. circumflexus, *Walk. op. cit.* p. 451.—A. contrarius, *Walk. op. cit.* p. 452.) Antennæ alarum dimidio multo longiores, rufæ, vel rufo-fuscæ; clava infuscata. Frons vertexque fusco-villosi. Thorax griseo-fuscus, infra utrinque flavo bistrigatus; ♂ prothoracis valvula paullo elevata, saturate fusca, margine libero fere semicirculari anguste albo. Pedes flavidi; tarsis nigricantibus; femoribus tibiisque anticis intermediisque supra fuscescentibus. Abdomen griseo-fuscum; in ♂ appendicibus parvis ante apicem instructum. Alæ sat latæ, ad apicem acutæ, vix falcatæ, vitreæ, vel interdum testaceo paullo tinctæ; ad apicem (in ♀) plerumque late testaceæ; area subcostali et interdum (præcipue in ♀) area costali infuscatis; pterostigmate albido vel flavo-albido, pallide venato; venis venulisque nigris; margine interiore anticarum ante basin leviter exciso; angulo axillari paullo producto. Long. corp. 15–20‴; exp. alar. 42–50‴; postic. 36–43‴.

Apparently very common in the Amazon region, and widely spread in Brazil. I have it from localities as widely separated as

Pebas on the Upper Amazons and Parana in South Brazil, without differences that seem to be specific. According to information kindly furnished by Dr. Hagen, who possesses the type, this is certainly Burmeister's species.

2. H. FLAVICORNIS (*De Selys, in litt.*), n. sp. Antennæ alarum dimidio vix longiores, omnino flavæ. Thorax abdomenque fusca, ille infra albidus. Pedes pallide flavi; tarsis fuscescentibus. Alæ latæ, fere vitreæ, ad apicem obtusæ; area costali subcostalique infuscatis; pterostigmate pallide infuscato, nigro-venato; anticarum margine interiore ante basin leviter exciso, angulo axillari in dentem triangularem producto (alæ hoc modo appendiculatæ) (♀). Long. corp. 12‴; exp. alar. antic. 44‴, postic. 39‴.

Hab. Cuernavaca, Mexico. In the collection of Baron de Selys Longchamps.

This fine species differs from all others in the appendiculate anterior wings, though otherwise it is allied to *costatus* and other neighbouring forms.

3. H. MICROCERUS, *Rambur.* (Byas microcerus, *Ramb. Névrop.* p. 362.)

Hab. Antilles.

Unknown to me. I have seen no species that appears absolutely to accord with Rambur's description.

4. H. TERMINALIS, nov. sp. Antennæ alarum dimidio æquales, vel vix breviores, testaceæ; clava obscuriore. Frons vertexque fusco-villosi. Thorax griseo-fuscus, indistincte flavido varius, infra sparse cano-pilosus; ♂ prothoracis valvula paullo producta, auriformi, margine libero fere semiovato. Pedes sordide flavidi; tarsis nigris. Abdomen fuscum. Alæ angustatæ, ad apicem subacutæ, vitreæ; margine costali anticarum (area costali subcostalique), apicibusque omnium late venuste brunneis; venis venulisque brunneis; pterostigmate magno, albido, pallide venato; margine interiore anticarum ante basin regulariter convexo, angulo axillari fere obsoleto. Long. corp. 19‴; exp. alar. antic. 38‴, postic. 35‴.

Hab. Tapajos (*Bates*). In the British and Oxford Museums.

A pretty species, remarkable for its narrow wings, the apices of which are broadly brown in both sexes.

5. H. LEUCOSTIGMA, *Walker.* (Ascal. leucostigma, *Walk. Trans. Ent. Soc. Lond.* ser. 2, vol. v. p. 195.) Antennæ alarum dimidio breviores, rufo-fuscæ; clava obscuriore. Frons vertexque fusco-pilosi. Thorax griseo-fuscus, vix flavo-varius. Pedes griseo-flavi; femoribus tibiisque supra fuscescentibus; tarsis nigris, articulo ultimo ad apicem rufo-testaceo. Abdomen griseo-fuscum. Alæ latæ, ad apicem subobtusæ, vitreæ; margine antico anticarum (area costali

subcostalique) pallide fusco; venis ramulisque fusco-nigris; pterostigmate magno, albo, pallide venato; margine interiore anticarum ante basin regulariter convexo, angulo axillari fere obsoleto (♀). Long. corp. 18‴; exp. alar. antic. 43‴, postic. 38‴.

Hab. Amazons (*Bates*). In the British and Oxford Museums.

6. H. ALBISTIGMA, *Walker*. (Ascal. albistigma, *Walk. Cat. Brit. Mus. Neurop.* p. 452.) Antennæ alarum dimidio paullo breviores, testaceæ; clava fuscata, intus ad apicem flavida. Frons cervino-villosus. Thorax rufo-griseus, infra utrinque flavo-vittatus, flavo-varius. Pedes flavi; femoribus anticis intermediisque vix fuscescentibus; tarsis nigris. Alæ latæ, fere vitreæ; apicibus obtusis, late testaceis; pterostigmate albo, pallide venato: anticarum area costali subcostalique infuscatis, margine interiore ante basin regulariter convexo, angulo axillari fere obsoleto: posticæ anticis angustiores, margine antico (apicem versus excepto) haud tincto (♀). Exp. alar. antic. 40‴, postic. 39‴.

Hab. Honduras.

7. H. SUBCOSTATUS, *Burmeister*. (Ascal. subcostatus, *Burm. Handb.* ii. p. 1000.)

Hab. Brazil.

I cannot apply Burmeister's description, or a more explicit account of the characters of the insect received from Dr. Hagen, to any species I have seen, with absolute certainty. Nevertheless I think the species probably identical with the next-noticed, *H. injurius*. Burmeister states he had seen several *males*. However, I believe he did not know the male of either *costatus* or *subcostatus*. His types possess no prothoracic valve; neither does any specimen of *Haploglenius* in Hagen's collection, as he informs me; hence I doubt not that all are females.

8. H. INJURIUS, *Walker*. (Ascal. injurius, *Walk. Cat. Brit. Mus. Neurop.* p. 447.) Antennæ alarum dimidio æquales, fuscæ, ad basin flavæ; clava nigra, extus supra infraque ochracea. Frons cervino fuscoque villosus. Thorax obscure testaceus, griseo-varius. Pedes griseo-flavidi; tibiis subtus fusco-lineatis; tarsis piceo-nigris. (Abdomen mutilatum.) Alæ elongatæ, sat latæ, obtusæ, vitreæ; venis venulisque nigris; pterostigmate pallide flavo, nigro-venato: margine interiore anticarum ante basin fere regulariter convexiusculo, angulo axillari obtuso (♀). Exp. alar. antic. 40‴, postic. 37‴.

Hab. Brazil.

9. H. DAMNOSUS, *Walker*. (Ascal. damnosus, *Walk. Cat. Brit. Mus. Neurop.* p. 449.) Antennæ alarum dimidio longiores. Thorax fusco-flavoque varius. Pedes flavi; tibiis extus fusco-lineatis; tarsis nigris.

Abdomen fuscum, infra pruinosum. Alæ breves, latæ, posticæ basin versus valde dilatatæ; margine antico (area costali subcostalique) pallide flavido tincto; pterostigmate pallide flavido, nigro-venato (♀). Long. corp. 15‴; exp. alar. antic. 35‴, postic. 32‴.

Hab. Brazil?

This species connects the group of *costatus* with that of *arenosus*.

10. H. INIQUUS, *Walker*. (Ascal. iniquus, *Walk. Cat. Brit. Mus. Neurop.* p. 448.) Antennæ alarum dimidio paullo longiores. Frons nigro-villosus. Thorax supra fulvo-fuscoque varius, infra albo-pruinosus. Pedes albidi; tibiis extus fusco-variis. Abdomen fulvum, supra nigro geminato-punctatum. Alæ vitreæ, pernitidæ, venuste iridescentes; venis venulisque nigris; pterostigmate brunneo, nigro-venato: anticæ elongatæ, paullo angustatæ; posticæ basin versus valde dilatatæ, apicem versus angustatæ (♀). Long. corp. 17‴; exp. alar. antic. 34‴, postic. 29‴.

Hab. Villa Nova, Amazons (*Bates*).

11. H. ARENOSUS, *Walker*. (Ascal. arenosus, *Walk. Cat. Brit. Mus. Neurop.* p. 450.) Antennæ nigro-piceæ, alarum dimidio paullo longiores; clava nigra, infra ochraceo-suffusa. Frons fulvo-piceoque villosus. Thorax fuscus, supra utrinque testaceus, infra utrinque late flavidus. Pedes testacei; tarsis nigris. Abdomen brunneum, basin versus cinereo-villosum (thorax abdomenque interdum fere omnino albo-pruinoso). Alæ vitreæ, obtusæ, sat latæ; venis venulisque nigris; pterostigmate flavo, nigro-venato. Long. corp. 14‴; exp. alar. antic. 27–32‴, postic. 24–29‴.

Hab. Amazons (*Bates*).

I think it very possible that *arenosus*, *iniquus*, and *impediens* are forms of one species; but this can only be decided by the investigations of future observers. Mr. Bates paid but little attention to the *Neuroptera*. In other orders he proved incontestably that, in the regions he explored, different localities presented local forms that to all intents and purposes are entitled to be considered distinct: this may also obtain in the *Ascalaphidæ*. *H. iniquus* and *impediens* certainly appear to have the wings much more *glossy* than *arenosus*; and *iniquus* especially has narrower anterior and more dilated posterior wings.

The prothoracic lobe of the male in *arenosus* is much less evident than in that of the group of *costatus*: it is smaller, and so closely applied over the front portion of the mesonotum as to be scarcely distinguishable from the anterior lobe of that segment.

12. H. IMPEDIENS, *Walker*. (Ascal. impediens, *Walk. Cat. Brit. Mus. Neurop.* p. 449.) Antennæ alarum dimidio paullo longiores, nigræ; clava infra in medio flava. Frons cervino-fuscoque villosus. Thorax griseus, supra vittis duabus longitudinalibus flavis, infraque vitta utrinque lata flavo-albida, ornatus. Pedes pallide flavidi; femoribus, tibiisque extus fuscis; tarsis nigris. Abdomen fuscum, supra utrinque flavido-vittatum. Alæ breves, latæ (posticæ basin versus valde dilatatæ), vitreæ, pernitidæ, venuste iridescentes; venis venulisque nigris; pterostigmate pallide flavo, nigro-venato. Long. corp. 13'''; exp. alar. antic. 33''', postic. 29'''.

Hab. Para (*Bates*).

13. H. IMMACULATUS, *Olivier*. (Ascal. immaculatus, *Oliv. Encyc. Méthod.* iii. p. 246.)

Hab. South America.

Olivier certainly had a species of *Haploglenius* before him when he wrote his description; but it is impossible to identify it. His remark that "Les ailes de cet insecte lui donnent un peu l'air d'une libellule," has more significance than he probably intended, when the position of the wings in repose is taken into consideration.

Genus PTYNX, *Lefebvre*.

(Haploglenius, *Ramb.* nec *Burm.*)

Wings elongate, narrow, the two pairs nearly equal in length, the posterior pair somewhat narrower; the basal portion longly excised on the inner margin, and very narrow: anterior pair appendiculate; posterior pair with a slight dilatation at the extreme base of the inner margin: network very close; the neuration furnished with strong hairs; and there are also strong but short hairs on the membrane of the cellules, especially in the apical portion.

Antennæ short, scarcely more than half the length of the wings, robust; club short and broad.

Thorax hairy.

Abdomen slender in the ♂, acuminate, hairy, with a pair of very short, somewhat spoon-shaped, semicircular terminal appendices: more obese and shorter in the ♀.

Legs with the spurs of the posterior tibiæ nearly equalling the first three tarsal joints.

Hab. Southern United States.

Lefebvre refers *costatus* of Burmeister to this genus as the type; but I believe he misunderstood Burmeister's insect

Species.

I am acquainted with two species, as under:—

1. P. APPENDICULATUS, *Fabricius*. (Ascal. appendiculatus, *Fab. Ent. Syst.* ii. p. 96; *Hag. Stett. ent. Zeit.* 1863, p. 376.—Haplogl. appendiculatus, *Ramb. Névrop.* p. 363.— Ptynx costatus, *Lefebv.*, *Guérin's Mag.* 1842, nec *Burm.*) Antennæ rufo-piceæ; clava infuscata. Thorax fuscus, supra rufo-varius, fusco-hirtus; infra utrinque flavidus. Pedes flavidi; tarsis infuscatis. Abdomen supra testaceo fuscoque varium, fusco-hirsutum; infra flavidum, vittis tribus nigris, interruptis, ornatum. Alæ subvitreæ; area costali subcostalique (illa pallidiore) brunneis: pterostigmate brunneo, subobsoleto; venis venulisque brunneo-testaceis, nigro-hirsutis. Exp. alar. 41‴.

Hab. Georgia (and probably other Southern States).

2. P. JUVENILIS, nov. sp. Antennæ nigro-piceæ; clava nigra. Thorax niger, supra flavo-maculatus, fusco-villosus, infra utrinque flavus, cano-villosus. Pedes fusci; femoribus tibiisque flavo-lineatis; tarsis nigro-piceis. Alæ subvitreæ; area subcostali infuscata; pterostigmate nigro-notato; venis venulisque nigris. Exp. alar. 34‴.

Hab. Texas (*Belfrage*). In my collection.

Much smaller than *appendiculatus*, and evidently distinct.

Genus CORMODES, n. g.

Wings elongate, rather broad, nearly equal, margins parallel, apex obtuse; anterior pair obliquely excised at the extreme base of the inner margin, not appendiculate: network open.

Antennæ shorter than the wings, curved downwards at the tip; club large, pyriform.

Thorax very robust, and strongly villose.

Abdomen, ♀, very short, robust, obtuse.

Legs with the spurs of the posterior tibiæ as long as the first two tarsal joints.

Hab. West Africa.

Species.

1. C. INTRACTABILIS, *Walker*. (Ascal. intractabilis, *Walk. Trans. Ent. Soc. Lond.* 2nd series, vol. v. p. 196.) Antennæ fuscæ; clava nigra, subtus ad apicem testacea. Frons fusco-villosus. Thorax pallide ...eus, fusco-flavoque-varius, cano-lanuginosus; supra n... ...rvis nigris. Pedes grisei; nigro-spinosi; tarsis g... ...bus. Abdomen griseum, nigro-varium, infra ad... ...lata, transversa, nigra, ornatum. Alæ

anchored seen versus, [illegible]; pterostigmate [illegible], [illegible] notato; venis venulisque plerumque flavis, nonnullis nigris (♀). Long. corp. 14‴; exp. alar. antic. 47‴, postic. 43‴.

Genus Idricerus, n. g.

Wings elongate, rather narrow, slightly dilated in the middle, apex subacute; anterior pair with a semicircular excision at the extreme base of the inner margin, followed by a small obtusely angular dilatation, and afterwards shallowly excised, not appendiculate: network moderately open.

Antennæ shorter than the wings, straight; club very large, broadly and shortly pyriform; a dense tuft of hairs on the face and between the antennæ.

Thorax very villose.

Abdomen shorter than the wings, moderately stout.

Legs with the spurs of the posterior tibiæ scarcely equalling the first two tarsal joints.

Hab. North India.

Allied to *Ogcogaster*, but differing from it in the form of the wings, especially at the basal portion of the inner margin, and in the longer and less robust abdomen.

Species.

1. I. decrepitus, *Walker*. (Ascal. decrepitus, *Walk. Trans. Ent. Soc. Lond.* ser. 2, vol. v. p. 197.) Frons vertexque cinereo-villosa; pilis inter antennas nigris. Antennæ pallide flavæ, nigro-cinctæ; articulo basali clavaque nigris. Thorax niger, antice flavo-varius, supra in medio fusco-villosus, utrinque et infra cinereo-villosus. Pedes fusci; tibiis late flavo-bicinctis, nigro-hirsutis; tarsis nigris, articulo basali ad basin testaceo; unguiculis calcaribusque rufis. Abdomen nigrum, paullo cinereo-pilosum; segmentis duobus basalibus supra testaceo-maculatis. Alæ vitreæ; venis venulisque nigris, nonnullis nigro-marginatis, flavo-interruptis; pterostigmate brunnescente, nigro-venato. Long. corp. 12-15‴; exp. alar. antic. 32-40‴.

I have examples from North India, taken in May and June by Capt. A. M. Lang, R.E.

Walker could not have observed the entire eyes, or he would never have indicated (*l. c.*) that the species bel[illegible] [illegible]an of *Ogcogaster* (*tessellatus*, &c.), with which [illegible] whatever.

2. I.(?) OBSCURUS, *Westwood*. (Ascal. (Haplogl.) obscurus, *Westw. Cab. Or. Ent.*)

I can say nothing as to this species; the type is no longer in existence, or cannot be found: I am acquainted with no Asiatic species with simple eyes, excepting *I. decrepitus*.

Genus MELAMBROTUS, n. g.

Wings long and very narrow, the inner margin longly excised at the base, afterwards the inner and costal margins are nearly parallel; anterior pair appendiculate: network rather close; transverse branch of the lower cubitus confluent with the postcosta in all the wings.

Antennæ short and stout, nearly straight, only about half the length of the wings, without hairs at the base; club roundly capitate.

Thorax slightly villose above, densely so on the breast.

Abdomen about the length of the wings, subcylindrical, without appendices in the ♂.

Legs very short and strongly spinous; spurs of the posterior tibiæ as long as the first two tarsal joints.

Hab. South-west Africa.

A remarkable genus, founded on the single species described below: the wings are narrower, and the antennæ shorter, than in any other genus of *Holophthalmi*, and the facies altogether peculiar. In the posterior wings the branch of the lower cubitus is almost obsolete, scarcely distinguishable from the ordinary transverse veinlets, owing to the space between the veins being so greatly narrowed.

Species.

1. M. SIMIA, nov. sp. Frons cinereo-pilosus. Vertex transverse fusco et flavo-varius, fusco-villosus. Antennæ flavæ; clava intus nigro tenuiter semicincta. Thorax fusco-griseus, testaceo-varius, supra sparse fusco-pilosus, infra dense cinereo-villosus; supra maculis tribus, quarum duæ punctiformes, altera transversa, semilunata, nigris, late cinereo-cinctis, vel marginatis. Pedes nigri, cinereo-pilosi, nigro-spinosis; tibiis [illegible] a obscure testaceis. Abdominis dimidium basale cinere[illegible] punctatum, apicale nigrum. Alæ vitreæ, striga subc[illegible] sque ad apicem extensa, in aream poststigmaticalem [illegible] ornatæ; venis venulisque plerumque nigris, nonnu[illegible] tigmate flavido, intus nigro-notato (♂). Long. corp[illegible] ntic. 32'''.
Hab. Damara Land ([illegible] y collection.

Genus TM

Wings elongate, the basal p strongly excised and petiol anterior pair: after the m and nearly oval, acute at t branch of the lower cubitus the wings.

Antennæ much longer than the wings, furnished with verticillate hairs at the base: club extremely long and slender.

Thorax scarcely villose.

Abdomen slender, shorter than the wings (without appendices in the ♂?).

Legs with the spurs as long as the first three tarsal joints.

Hab. Mozambique.

Founded on a single species, *Ascal. laceratus*, Hagen, which I have not seen: the characters have been drawn up from Hagen's careful description and beautiful figure. A very sharply defined genus, without a parallel among the *Holophthalmi*; the formation of the antennæ approaches that of *Colobopterus* among the *Schizophthalmi*.

Species.

1. T. LACERATA, *Hagen*. (Ascal. laceratus, *Hag.*, *Peters's Reise nach Mossamb.* p. 92, pl. v. fig. 3.)

Division II. SCHIZOPHTHALMI.

Genus CORDULECERUS, *Rambur*.

(Suphalasca, *part.*, *Lefebv.*, *Hag.*)

Wings ample, usually broad, but varying much. Anterior pair with an evident excision at the extreme base of the inner margin, not appendiculate, dilated in the middle, inner margin contracted at the point where the cubiti terminate; apex acute posterior pair with the anal portion of the inner margin ordinarily deeply sinuate in the ♂, slightly sinuate in the ♀, broad at the anal portion, contracted at the termination of the cubiti, no transverse branch of the lower cubitus; postcosta strongly sinuous: network open.

Antennæ as long as the wings, the extreme base with a few verticillate hairs; club elongately spoon-shaped; a very dense tuft of hairs between the antennæ.

Eyes with the divisions equal.
Thorax very densely and longly villose.
Abdomen short; rather slender in the ♂ and without appendices; shorter and very obese in the ♀.
Legs with the spurs of the posterior tibiæ somewhat exceeding the first two tarsal joints.
Hab. Tropical and South America.

At first sight a very strongly marked genus, characterized by its ample and subtriangular wings, the anal portion of the posterior pair being profoundly sinuate in the ♂; but at least one species (I believe, the typical *Asc. surinamensis* of Fabricius) shows an affinity with *Ulula*: the tibial spurs are certainly shorter than in that genus, but not to the extent indicated by Rambur, who says "aussi longs que les deux premiers articles;" to my eyes they appear fully as long as the first *three* joints: the club of the antennæ is more elongately oval than in *Ulula*, and very concave above; the base of these members scarcely furnished with verticillate hairs.

Species.

Much confusion has existed in the synonymy; and Hagen (Hemerob. Synop. Synonym.) has attempted to overcome this by grouping several names as synonyms of one species, *C. surinamensis*; but I believe that all previous writers have failed in identifying the true Fabrician species of that name, and that at least six distinct species exist in collections:—

1. C. VULPECULA, *Burm.* (Ascal. vulpecula, *Burm., op. cit.* p. 1001, ♂.—A. alopecinus, *Burm. Handb.* ii. p. 1000, ♀.—A. surinamensis *, *Guérin, Icon.* p. 387, pl. lxii. f. 3, *nec Fab.* ♀.—C. surinamensis, *Ramb. Névrop.* p. 360, text, part.—A. garrulus, *Walk. Cat. Brit. Mus. Neurop.* p. 441, ♂.—A. litigiosus, *Walk. op. cit.* p. 441, ♀.) Caput thoraxque supra densissime rufescenti-villosa, hic supra macula parva mediana fusca notatus, infra fuscescente-villosus. Antennæ rufo-fuscæ; clava vel supra solum, vel omnino, ochracea. Pedes flavidi; tibiis basin versus extus indistincte fusco-semicinctis. Abdomen fusco-nigrum, supra rufo-maculatum. Alæ amplæ, inæquales, pallide

* Baron De Selys L[illegible] in the 'Compte Rendu' of the Meeting of the Société Entomolog[illegible]e, held on the 6th May, 1871, adopts "*brasiliensis*," Guérin, [illegible]ut I cannot admit this name, because Guérin distinctly state[illegible]' that "*brasiliensis*" was a printer's error for "*surinamens*[illegible]*late* in some copies only; in th[illegible] [illegible]t the name is alway[illegible]

[illegible]-fuscæ; veni[illegible]
stigmate fuscescen[illegible]
excisus; in ♀ lati[illegible]
fusco mixtus (fuscus[illegible]
exp. ♂ 15‴; ♀ 17‴
Hab. [illegible] to M[illegible]

Apparently having [illegible]
species.

2. C. VILLOSUS, *Pal*[illegible]
Af. et Amer. p. 86, [illegible]
fuscæ, ad basin rufe[illegible]
rufo-maculatum. [illegible]
tinctæ; venis venuli[illegible]
coste: margo analis [illegible]
excisus, macula sub[illegible]

Hab. San Domingo ([illegible]
M'Lach.).

Certainly distinct f[illegible]
gin of the posterior [illegible]
nuate than in that sp[illegible]
the ♀ is smaller and [illegible]
wings is also different and approaches that in the ♂ of *C. Maclachlani*. Beauvois's type is in De Selys's collection.

3. C. MACLACHLANI, *De Selys*. (Cord. surinamensis, *Ramb. Névrop.* p. 360, text, part., pl. 9. f. 1 (nec *Fab.*)—C. Maclachlani*, *Selys, Compt. Rend. Soc. Ent. Belg.* 6 Mai, 1871.) Frons vertexque densissime nigro-villosi. Antennæ nigræ; clava supra rufescente. Thorax supra in medio densissime fulvo-griseo villosus, utrinque et infra nigro-villosus. Pedes rufo-testacei. Abdomen nigrum. Alæ amplæ, inæquales; in ♂ pallide fusco-tinctæ: margo analis posticarum vix excisus; pterostigmate brunneo, nigro-venato; venis venulisque nigris: anticæ in ♀ ut in ♂; posticæ ad basin late saturateque nigro-fuscæ, ad apicem fusco-suffusæ; margo analis leviter excisus. Magnitud. fere ca *C. vulpeculæ*.

Hab. Brazil. In De Selys's collection, *olim* Rambur's.

Var. Paullo minor. Alæ anticæ in ♀ ad basin saturatiores; posticæ ad basin apicemque late et intense nigro-fuscæ, nitidæ.

Hab. Rio Ucayali (*Bartlett*). In my collection.

Rambur has evidently comprised *C. vulpecula* and *Maclachlani*,

* I had intended another name for this species; but after the paper was read I received the monthly 'Compte Rendu' of the Société Ent. de Belgique, in which De Selys, in a note on the species of *Ascalaphi* confounded under the term *surinamensis*, proposes to call it *Maclachlani*. I have no alternative but to accept his proposition.

and probably also *villosus*, in his description (figuring only *MacLachlani*) of *surinamensis*.

The variety in my collection from the Ucayali differs especially in the sharply defined *apical*, as well as basal, dark portion of the posterior wings of the ♀.

4. C. UNICUS, *Walker*. (Ascal. unicus, *Walk. Trans. Ent. Soc. Lond.* ser. 2, vol. v. p. 195.) Frons fusco-villosus. Antennæ rufescentes, nigro-annulatæ; clava nigra. Thorax supra cinereus, utrinque nigro-fuscus. Pedes testacei. Abdomen supra rufescens, infra infuscatum. Alæ anticæ apicem versus angustatæ, hyalinæ, ad basin fusco-tinctæ; maculis duabus, quarum una apicalis, altera parva subapicalis, pterostigmate, venulisque costalibus, fuscis: posticæ elongato-triangulares, peracutæ, omnino fuscæ, macula hyalina parva ad costæ apicem, excepta; margo analis obliquus, leviter excisus. Long. corp. 11‴; exp. alar. antic. 32‴, postic. 27‴.

Hab. Brazil?

5. C. SUBIRATUS, *Walker*. (Ascal. subiratus, *Walk. Cat. Brit. Mus. Neurop.* p. 439.) Frons nigro-pervillosus. Antennæ rufescentes, nigro-annulatæ; clava ochracea, infra vix infuscata. Thorax supra griseo-ochraceus, utrinque niger; vitta angustata mediana nigra: infra niger. Pedes picei; femoribus pallidioribus. Abdomen nigrum. Alæ anticæ apicem versus paullo angustiores, acutæ, hyalinæ, ad basin fusco-suffusæ; pterostigmate nigro: posticæ hyalinæ, dimidio basali fere, strigisque nonnullis, fuscis; margo analis leviter exciso-sinuatus. Long. corp. 10‴; exp. alar. antic. 28‴, postic. 25‴.

Hab. Guatemala, Mexico, Honduras, Brazil.

6. C. SURINAMENSIS, *Fab.* (Ascal. surinamensis, *F. Ent. Syst. Suppl.* p. 207 (*nec auct.*) Caput fulvo-villosum. Antennæ nigræ; clava ochracea. (Thorax fusco-pilosus?) Pedes picei; tarsorum articulis quatuor basalibus fusco-nigris. Abdomen nigro-fuscum, transverse fulvo-maculatum. Alæ paullo latæ, subæquales, hyalinæ; pterostigmate parvo, flavescente: ♀ margo analis posticarum paullo excisus, macula fusca subquadrata ad angulum analem signatus. Long. corp. 11‴; exp. alar. antic. 33‴, postic. 30‴.

Hab. Surinam (*Fabricius*); Brazil, without indication of special locality (*De Selys's collection*).

I have seen one ♀ from De Selys's collection, from which the above diagnosis is drawn up. The colour of the villosity of the head and body is somewhat uncertain, owing to the hairs being matted together by some liquid.

There is no doubt, in my mind, that this is the true Fabrician species; it is the only one to which the description will apply,

especially as regards the word
are much less broad than in
in this respect it approaches

Genus U

(Suphalasca, p

Wings ordinarily rather broad
parallel, a small excision at extreme base of inner margin of anterior pair, not appendiculate: network open; posterior wings without a transverse branch of the lower cubitus, and with the postcosta long and sinuous.

Antennæ as long as, or longer than, the wings, furnished with verticillate hairs at the base; club pyriform, rather short.

Eyes with the upper division rather larger than the lower.

Thorax slightly villose.

Abdomen not so long as the wings, moderately short in the ♂, obese in the ♀; without appendices.

Legs with the spurs of the posterior tibiæ equalling, or slightly exceeding, the first three tarsal joints.

Hab. North, Central, and South America.

This genus approaches the aberrant forms of *Colobopterus* on the one hand, and some forms of *Cordulecerus* on the other. From both it may be separated by the form of the hind wings. In *Cordulecerus* these are more or less excised and sinuate in the anal portion of the inner margin, the shape being somewhat subtriangular; in *Colobopterus* these wings are narrower, especially at the base; in *Ulula* they are gently rounded at this part, though varying much in breadth according to the species.

Species.

I have utterly failed in my attempts to separate the described species, in order to diagnose them anew. Some of them certainly vary immensely, even in the same locality, according to Mr. Bates's observations. On the other hand, I am convinced that several names have been sunk to the rank of synonyms without sufficient reason. Locality doubtless causes much modification; and this is especially noticeable in the West-Indian Islands, each of which possibly possesses what it has become the fashion to call a "Darwinian species" peculiar to it.

1. U. HYALINA, *Latreille*. (Ascal. hyalinus, *Lat. Humboldt's Recueil*, ii. p. 118, tab. xl. fig. 7: *Hag. N. Amer. Neurop.* p. 238.—A. senex,

Burm. Handb. 1001 (*teste Hagen*).—U. senex, *Ramb. Névrop.* p. 357 ?
—A. 4-maculatus, *Say, Long's Exped.* ii. p. 305.)

Hab. Southern States; West Indies.

I have a series of examples from Texas which I consider to belong to this species. In some of them there is a grey clouding in the apex of the hind wings.

2. U. AVUNCULUS, *Hagen*. (Ascal. avunculus, *Hag. N. Amer. Neurop.* p. 238.)

Hab. Cuba.

According to Hagen, very closely allied to *hyalina*.

3. U. MACLEAYANA, *Guilding*. (Ascal. Macleayanus, *Guilding, Trans. Linn. Soc.* xiv. p. 140, tab. vii. fig. 11.)

Hab. St. Vincent (*Guilding*).

Merged in *U. hyalina* by Hagen. Typical examples are in the Oxford Museum (with larvæ); and these appear to be distinct from the Texan individuals that I consider to be *hyalina*; they are smaller, narrower-winged, and much less robust, though of the same general form. The specimens from Jamaica placed under the name by Walker are quite different, and are only forms of his *surinamensis* (*vide infra*), wanting the apical clouding of the hind wings.

4. U. QUADRIPUNCTATA, *Burmeister*. (Ascal. 4-punctatus, *Burm. Handb.* ii. p. 1001; *Hag. N. Amer. Neurop.* p. 238.—A. 3-maculatus, *Lefebv. Guérin's Mag.* 1842.—A. surinamensis, *Walk. Cat. Brit. Mus. Neurop.* p. 439 (*nec* Fab. ? ?).—A. Macleayanus, *Walk. op. cit.* p. 436 (*nec Guild.* ?).)

Hab. United States; Jamaica ? ?

Walker's *surinamensis* cannot be a form of *limbata*, as stated by Hagen (N. Amer. Neurop. p. 239)—according to my ideas, being far too large and broad-winged an insect; but it is scarcely possible that it can be identical with Burmeister's *4-punctatus*.

5. U. MICROCEPHALA, *Rambur*. (U. microcephala, *Ramb. Névrop.* p. 359.)

Hab. Havana; Brazil ?

I have examples indicated vaguely as from "Brazil," which seem to agree with Rambur's description, the head being certainly much smaller than in allied forms; otherwise they are very close to Rambur's type of his *senex*.

6. U. CAJENNENSIS, *Fabricius*. (Ascal. cajennensis, *Fab. Mant. Ins.* p. 250; *Ent. Syst.* ii. p. 96.)

Hab. Cayenne (*Fabricius*).

Rambur's name m[illegible]

7. U. [illegible], R[illegible] [illegible] p. 3[illegible], tab. [illegible]
Hab. Bolivia.
Indeterminable.

8. U. limbata, Bu[rm.] [illegible] p. [illegible].—Ulula [illegible] *Walk. Cat. Brit. M*[illegible] *Ent. Soc. Lond.* p. [illegible]
Hab. Central and South America.

9. U. vetula, Rambur. (Ulula vetula, Ramb. Névrop. p. 3[illegible].—Ascal. [illegible], *Walk. Cat. Brit. Mus. Neurop.* p. 4[illegible].)
Hab. South America.

How far my appreciation of the synonymy of the last two species may be correct remains to be proved. Possibly several good species may be erroneously grouped together under the names; but they vary so much that it is impossible to form a correct opinion without extensive series from many localities.

The three species diagnosed below are very distinct, and undoubtedly new.

10. U. mexicana, nov. sp. Antennae nigrae, tenuiter flavo-cinctae; clava nigra, flavido-terminata. Frons verticeque fusco-villosi. Thorax niger, supra rufo-maculatus, infra cinereo-villosus. Pedes picei; tarsis nigro-annulatis. Abdomen nigrum, brunneo-varium. Alae latae, ad apicem vix acutae, vitreae; pterostigmate nigro-fusco; venis venulisque nigris: posticae macula magna triangulari prope basin marginis interioris, fusca, ornatae. Long. corp. 12-13'''; exp. alar. antic. 25-29''', postic. 23-27'''.
Hab. Mexico. In De Selys's collection and in the Oxford Museum.

Much resembles *Cordulecerus surinamensis*, F. An individual in the Oxford Museum, probably immature, wants the spot on the hind wings.

11. U. ampla, nov. sp. Antennae flavidae, tenuiter nigro-cinctae; clava nigra. Frons flava, fusco-villosa. Occiput flavum, transverse griseo-strigatum. Thorax rufo-ochraceus, supra fusco-varius, infra cinereo-villosus. Pedes flavi; tarsis nigro annulatis. Abdomen rufo-ochraceum, supra utrinque oblique nigro-strigatum, infra infuscatum. Alae latae, in medio dilatatae, vix acutae, vitreae, vel in posticis ad apicem flavido-fumosae, vel omnino fumoso-tinctae; venis venulisque nigris; pterostigmate in anticis flavo, in posticis fuscescente. Long. corp. 13'''; exp. alar. antic. 29-33''', postic. [illegible]'''.
Hab. St. Domingo. In my own collection and in Brit. Mus.

Like the last, this species approaches *Cordulecerus* in its wing-formation. I have examined about half a dozen individuals, which differ only in the presence or absence of tinting of the wings.

12. U. AURIFERA, nov. sp. Antennæ nigræ, ad basin flavidæ; clava subtus vix flavescente. Caput thoraxque dense aureo-griseoque villosus. Pedes flavi, griseo nigroque hirsuti; femoribus tibiisque intermediis et posticis fuscescenti-cingulatis. Abdomen flavum, supra utrinque interrupte nigro bivittatum. Alæ angustatæ; pterostigmate flavo: anticæ vitreæ; humeris flavis; venis venulisque plerumque fuscis; subcosta flava, nigro-striata, cubito inferiore, cum ramulo transverso, flavis: posticæ anticis angustiores, vitreæ, aureo-suffusæ; cubito inferiore postcostaque flavidis. Long. corp. 12'''; exp. alar. antic. 28''', postic. 26'''.

Hab. Santarem (*Bates*). In the British and Oxford Museums.

A pretty species, remarkable for its long and narrow wings, and the delicate golden suffusion, which shows a tendency to invade both pairs, but is most evident on the posterior.

Genus COLOBOPTERUS, *Rambur*.

(Suphalasca, part., *Lefebv.*)

Wings long and narrow; the extreme base of the inner margin of the anterior pair with an excision, but not appendiculate; posterior pair ordinarily with a deep excision *before* the base of the inner margin, and then a dilatation, but varying much in form: network moderately open; no oblique branch of the lower cubitus in the posterior wings, the postcosta being long and sinuous; pterostigma small.

Antennæ as long as, or longer than, the wings, more or less provided with verticillate hairs in the basal portion; club long and slender.

Eyes with the divisions equal.

Thorax villose, especially on the breast.

Abdomen rather short, slender in the ♂ and without appendices; more robust in the ♀.

Legs long and slender; spurs of the posterior tibiæ as long as, or longer than, the first four tarsal joints.

Hab. South America.

Species.

Varying considerably in form; distinguished from *Ulula* by the long antennæ and long and narrow wings, which are generally more or less excised at the base of the inner margin; from *Orphne* it differs in the non-appendiculate anterior wings.

1. C. VERSICOLOR, *Burmeister*. (Ascal. versicolor, *Burm. Handb.* ii. p. 1004.—C. leptocerus, *Ramb. Névrop.* p. 361.—C. nematocerus, *Ramb. l. c.*) Antennæ flavæ, pilis verticillatis longis instructæ; apicibus articulorum nigris; clava valde elongata, supra flava, infra fuscescente. Frons dense fusco-villosus. Thorax fuscus, supra maculis nonnullis lineisque transversis, infra linea utrinque, flavis ornatus. Pedes pallide flavi; genibus, tibiisque extus (anticis fere omnino) fuscis; tarsis piceo-nigris. Abdomen fuscum, flavo-varium. Alæ vitreæ; venis venulisque nigris; pterostigmate nigro (interdum pallidiore, vix flavido): anticæ in medio paullo dilatato; angulo axillari obsoleto: posticæ ante basin profunde (in ♂ profundius) excisæ, ad basin obtuse dilatatæ. Long. corp. 11–13‴; exp. alar. 29–31‴.

Apparently common throughout Brazil, especially in the southern districts.

2. C. SUBRIPIENS, *Walker*. (Ascal. subripiens, *Walk. Cat. Brit. Mus. Neurop.* p. 443.) Antennæ alis æquales, nigro-fuscæ, pilis verticillatis sparsis basin versus fuscis instructæ; clava perelongata, supra flava. Frons niger, flavo-marginatus, supra fulvo hirsutus. Occiput fuscum, flavido-lineatum. Thorax niger, maculis flavis ornatus. Pedes pallide albo-flavidi; femoribus tibiisque extus fuscescentibus; tarsis fuscis. Alæ fere ut in *C. versicolori*, sed paullo latiores: anticarum margo interior basin versus longe excisus, angulo axillari prominente: posticarum parte dilatata ad basin parva. Long. corp. 12‴; exp. alar. antic. 29‴, postic. 26‴.

Hab. Venezuela.

Allied to *C. versicolor*, but certainly distinct.

3. C. DELICATULUS, nov. sp. Antennæ alis longiores, nigræ, vix ad basin pilis verticillatis instructæ; clava nigra, supra infraque in medio flava. Frons niger, supra fusco-villosus. Occiput piceum. Thorax supra fuscus, in medio flavus, infra albidus. Pedes flavidi, fusco-varii; tarsis nigris. Abdomen fuscum, supra utrinque strigis brevibus ochraceo-marginatis, ornatum. Alæ elongatæ, angustatæ, vitreæ, venis venulis pterostigmateque nigris, hoc magno: anticarum margine interiore basin versus paullo convexo, angulo axillari subacuto: posticæ anticis angustiores, subacutæ, ad apicem fumoso-nebulosæ; margine interiore basin versus leviter exciso. Long. corp. 11‴; exp. alar. antic. 27‴, postic. 24‴.

Hab. Santarem (*Bates*).

4. C. INTEGER, nov. sp. Antennæ alis longiores, flavidæ, ad articulorum apices nigræ, basin versus pilis verticillatis paucis instructæ; clava fusca, obscure pallidiore annulata. Frons fuscus, fusco-villosus. Thorax fuscus, supra flavo-maculatus, infra cano villosus. Pedes fusci; femorum dimidio basali flavo; tarsis nigricantibus. Abdomen fuscum, supra utrinque lineis nigris, ochraceo-marginatis, signatum. Alæ elongatæ, subobtusæ, vitreæ; venis venulisque nigris; pterostigmate nigro-fusco, nigro-venato: posticarum margine interiore ante basin recto, haud exciso, angulo axillari obtuso: posticarum margine interiore basin versus leviter exciso, ad basin vix dilatato. (♀) Long. corp. 11'''; exp. alar. antic. 29''', postic. 27'''.

Hab. Brazil? In my collection.

Possibly the female of *delicatulus*; but this is only conjecture.

5. C. SEPULTUS, *Walker*. (Ascal. sepultus, *Walk. Cat. Brit. Mus. Neurop.* p. 445.) Antennæ alis æquales, fuscæ, ad basin pallidiores, pilis verticillatis vix instructæ; clava fusca, ad basin flava. Frons niger, fusco villosus. Thorax fuscus, infra sparse cano-villosus. Pedes pallide testacei; tibiis extus fuscescentibus; tarsis nigris. Abdomen testaceum, supra fusco-varium. Alæ elongatæ, subobtusæ, vitreæ; venis venulisque nigricantibus; pterostigmate flavo: anticarum margine interiore ante basin leviter exciso, angulo axillari rotundato: posticæ anticis paullo angustiores; margine interiore ante basin longe exciso, ad basin paullo dilatato. Long. corp. 11'''; exp. alar. antic. 25''', postic. 22'''.

Hab. Brazil.

6. C. DISSIMILIS, nov. sp. ♂. Antennæ ante medium flexuosæ, subgeniculatæ, piceo-nigræ; geniculo setis spiniformibus ad articulorum apices intus instructo. Thorax minimus, supra utrinque late fusco-niger, infra plerumque flavidus. Pedes testacei; tibiis extus, tarsisque, fuscis, illis pallido-cinctis. Abdomen fuscum, supra basin versus utrinque lineis nigris, rufescenti-marginatis, notatum. Alæ vitreæ, paullo fumoso-tinctæ; venis venulisque nigris; pterostigmate sordide flavo: anticarum margine postico in medio valde dilatato, ante et pone medium leviter exciso; angulo axillari prominente, obtuso: posticæ valde angustiores; margine postico in medio paullo dilatato, ante basin valde exciso.

♀. Antennæ fere rectæ, pilis haud instructæ. Alæ vitreæ, haud tinctæ; pterostigmate pallidiore, fere albido: anticæ posticæque in medio vix dilatatæ, ante basin marginis postici leviter excisæ. Long. corp. 9–10'''; exp. alar. ♂ 17½''', ♀ 21'''.

Hab. Amazons (*Bates*).

This curious little species is remarkable for the dissimilarity of form in the sexes, as confirmed by the notes made *in situ* by Mr. [Bat]es. I have seen only one ♂, which is in the Oxford Museum.

Genus Orphne, *Lefebvre*.

Wings long, very narrow at the base, afterwards somewhat dilated; anterior pair appendiculate: network rather close; transverse branch of the lower cubitus in the posterior wings not evident, the postcosta not sinuous. The posterior wings differ greatly according to sex: in the ♂ there is a very large obtuse dilatation of the inner margin before the base; in the ♀ this dilatation is absent, and these wings are much narrower.

Antennæ slightly longer than the wings, the base furnished with sparse verticillate hairs; club pyriform.

Eyes with the divisions equal.

Thorax moderately villose.

Abdomen slender in the ♂, slightly more robust in the ♀.

Legs slender, the spurs of the posterior tibiæ equalling the first four tarsal joints.

Hab. South America.

This genus has an evident and great affinity with *Colobopterus*, from which it especially differs in the appendiculate anterior wings and in the great disparity of the form of the posterior wings, according to sex. I consider it to be certainly the genus intended by Lefebvre, as it is the only one that will agree with the characters given by him ("Ailes appendiculées; antennes plus longues que les ailes"). But he was certainly in error in referring his species to *appendiculatus* of Fabricius; and this appears to have misled Hagen, who (Stett. Zeit. 1866, p. 454) makes *Orphne* equivalent to *Haploglenius*.

Species.

1. O. impavida, *Walker*. (Ascal. impavidus, *Walk. Cat. Brit. Mus. Neurop.* p. 443, ♂.—A. intempestivus, *Walk. op. cit.* p. 444, ♀.
Hab. Amazons.

2. O. macrocerca, *Burmeister*. (Ascal. macrocercus, *Burm. Handb.* ii. p. 1000.)
Hab. Bahia.

Unknown to me; possibly identical with *O. impavida*. Burmeister's examples were probably females, although he indicates that he had seen both sexes. As I have before stated, the abdomens of the females vary greatly in robustness in the same species in Ascalaphidæ.

Genus ACMONOTUS, n. g.

Wings very narrow; the extreme base of the inner margin of the anterior pair with a slight excision, followed by a rather dilated angulation, but not appendiculate: posterior wings still narrower than the anterior, especially in the basal portion; inner margin longly and shallowly excised to the base: transverse branch of the lower cubitus confluent with the postcosta in all the wings; the postcosta rudimentary, scarcely extending beyond the point of junction: network open.

Antennæ much shorter than the wings, straight; club suborbicular.

Eyes with the divisions nearly equal.

Abdomen longer than the wings, slender, gradually attenuated to the apex, provided with a pair of short, slightly divaricate, cylindrical terminal appendices in the ♂; first segment above elevated into an enormous conical hump, the front side of which is straight, the hinder side convex, notched at the apex.

Legs with the spurs nearly equalling the first two tarsal joints.

Hab. West Australia.

A very singular genus, founded on the species described below; the formation of the ♂ abdomen is without a parallel; but it is uncertain if the ♀ presents similar characters, though it is probable that somewhat similar peculiarities are present in that sex also.

Species.

1. A. INCUSIFER, nov. sp. Frons cinereo-villosus; clypeo labroque flavis. Vertex fusco-villosus. Antennæ flavo-albidæ, late nigro-annulatæ; clava infra nigra, supra albo-flava, tenuiter pallide annulata. Thorax niger, maculis tribus elongatis, quarum duæ longitudinales, una transversa postica, rufis, signatus. Pedes rufo-flavi; femoribus (apicibus exceptis), tibiis subtus omnino, supra semicinctis duobus, articulorum tarsorum apicibusque, nigris. Abdomen nigrum; infra macula elongata utrinque ad basin, marginibusque posterioribus segmentorum ad latera, rufescentibus: appendices dimidio basali nigro, apicali flavo, nigro tuberculato. Alæ hyalinæ; venis venulis pterostigmateque nigris; humeris flavescentibus (♂). Long. corp. 15‴; exp. alar. antic. 26‴, postic. 22‴.

Hab. West Australia. In Brit. Mus.

Genus SUPHALASCA, *Lefebvre* (restricted).

Wings elongate, narrow, the costal and inner margins nearly parallel; network rather open; the transverse branch of the

cluded a multitude of discordant forms; and Hagen (Stett. ent. Zeit. 1866, pp. 460, 461) arranges under it (among others) all the American species of Rambur's genus *Ulula*, between which and the Old-World forms there is really no relationship; his character, "postcosta simplici," will not strictly apply to *Suphalasca*, or to any Old-World group.

[See my 'Introductory Remarks' (p. 229) for reasons which induce me to think that the genus *Stilbopteryx* (*Myrmeleonidæ*?) may be related to *Suphalasca*.]

Species.

I arrange the species geographically, as follows:—

Australia.

1. S. FLAVIPES, *Leach*. (Ascal. flavipes, *Leach*, *Zool. Misc.* i. p. 48, pl. xx.—Bubo flavipes, *Ramb. Névrop.* p. 357.) Antennæ nigricantes, basi et ante clavam flavæ. Frons flavus, cano-villosus. Vertex nigro-villosus. Thorax flavus, supra utrinque niger, infra nigro-varius.

Pedes flavi, femoribus (ad apicem exceptis) tarsisque fusco-nigris. Abdomen nigrum, supra linea mediana, lateribus, infra marginibusque posterioribus segmentorum, flavis. Alæ subæquales; humeris, area subcostali, pterostigmateque, flavis; cellulis areæ poststigmaticalis triseriatis. Long. corp. 13–14'''; exp. alar. antic. 29–35''', postic. 24–29'''.

Probably distributed throughout New Holland.

2. S. IMPORTUNA, *Walker*. (Ascal. importunus, *Walk. Cat. Brit. Mus. Neurop.* p. 427.) *S. flavipedi* valde affinis, sed paullo minor; alis angustioribus, pallide fuliginoso-tinctis.

Hab. Moreton Bay.

Evidently very closely allied to *S. flavipes*, but apparently distinct, in consequence of the narrow and tinted wings. I have seen two individuals precisely similar.

3. S. SUBTRAHENS, *Walker*. (Ascal. subtrahens, *Walk. Cat. Brit. Mus. Neurop.* p. 430.) Antennæ tenuiores, nigræ, ad basin flavæ; clava flava, infra dimidio apicali nigro. Frons pallide flavus, in medio nigricans, cano-villosus. Vertex nigro-villosus. Occiput flavum, nigro-radiatum. Thorax supra murinus, utrinque niger; infra vel pruinoso-albidus, vel utrinque linea flavida signatus. Pedes nigri; posticis ad femorum apices, intermediis femoribus omnino, anticisque (tarsis exceptis), flavis. Abdomen nigrum, supra vitta dorsali interterrupta, aurantiaca, ornatum. Alæ elongatæ, subæquales; humeris flavidis; pterostigmate in anticis pallide brunneo, nigro-venato, in posticis nigro, vel nigro-fusco; area subcostali vix brunneo-tincta; cellulis areæ poststigmaticalis irregulariter triseriatis; in serie inferiore magnis, cæteris parvis. Long. corp. 14'''; exp. alar. antic. 32'''; postic. 28'''.

Hab. Australia. I have seen specimens from Rockhampton and from South Australia.

One example in my collection has the apical quarter of the posterior wings faintly tinged with brownish.

4. S. WILSONI, nov. sp. Caput, thorax, pedes alæque fere ut in *C. flavipede* (antennæ mutilatæ); venulæ transversæ costales, et infra radium, fusco-marginatæ. Abdomen nigrum, maculis dorsalibus marginibus segmentorum (supra interruptis), infraque ad basin et ad apicem, flavo-ornatum; apex pilis brevibus nigris utrinque vestitus. Long. corp. 14'''; exp. alar. antic. 32''', postic. 27'''.

Hab. South Australia (*C. A. Wilson*). In my collection.

The wings are rather narrower than in *flavipes*, and the fuscous margining or clouding of the costal and radial nervules gives them a different appearance. The dorsal margin of each abdominal segment appears to have a tendency to expand.

5. S. DIETRICHIÆ, *Brauer*. (Bubo Dietrichiæ, *Brauer, Verh. k.-k. zool.-bot. Gesells. in Wien*, 1869, p. 15.) Antennæ nigræ, ad basin flavæ. Frons pallide flavus, cano-villosus. Vertex niger, nigro-villosus. Occiput flavum, macula crescentiformi nigra ornatum. Thorax supra niger, flavo-maculatus, infra utrinque pruinoso-albidus. Pedes flavi, tarsis ad apices articulorum nigris. Abdomen fusco-nigrum vitta dorsali, punctis lateralibus, lineaque utrinque infra ad basin flavis, vel aurantiacis, ornatum. Alæ subæquales, sed posticæ anticis angustiores et breviores; humeris flavis; pterostigmate magno flavo-albido: area poststigmaticali pallide brunnea, cellulis triseriatis. Long. corp. 12‴; exp. alar. antic. 30‴, postic. 27‴.

Hab. Rockhampton.

Readily distinguishable from the other Australian species by the brown clouding of the apex of the wings; in the anterior wings this clouding is confined to the poststigmatical costal space, but in the posterior it invades almost the entire apex. The anterior wings are comparatively shorter and broader than in the allied species. I have an individual from the same locality as Brauer's.

6. S. INCONSPICUA, nov. sp. (Antennæ mutilatæ.) Frons niger, griseo-villosus. Clypeus labrumque flavi. Vertex niger, nigro-villosus. Occiput nigrum, in medio flavum. Thorax fuscescens, griseo-villosus, supra et infra indistincte piceo-notatus. Pedes nigri, nitentes; femoribus ad apicem exceptis rufo-flavis. Abdomen nigrum, nitidum, maculis lanceolatis dorsalibus, in medio, utrinque ad basin, marginibusque posterioribus segmentorum, supra, infra et utrinque interruptis, aurantiacis. Alæ elongatæ, posticæ anticis valde angustiores; humeris flavis; pterostigmate parvo, intense nigro. Long. corp. 12‴; exp. alar. antic. 26‴, postic. 24‴.

Hab. Victoria (*Edwards*). In my collection.

7. S. SABULOSA, *Walker*. (Ascal. sabulosus, *Walk. Cat. Brit. Mus. Neurop.* p. 427.) Antennæ nigræ, ad basin flavæ; clava flava, infra dimidio apicali nigricante, tenuiter flavo-cingulato. Frons flavus, in medio niger, densissime griseo-villosus. Thorax niger, griseo-villosus. Pedes nigri; genubus, articuloque ultimo tarsorum, flavis. Abdomen nigrum utrinque alternatim griseo-nigroque hirsutum; supra marginibus posterioribus segmentorum anguste rufo-aurantiacis. Alæ subæquales; humeris flavo-ochraceis; area subcostali infuscata; venis, venulis, pterostigmateque nigris; cellulis areæ poststigmaticalis biseriatis. Long. corp. 12‴; exp. alar. antic. 30‴, postic. 26‴.

Hab. Australia.

8. S. MAGNA, nov. sp. S. *sabulosæ* paullo affinis, sed valde major. Abdomen fere glabrum, nigro-fuscum, supra maculis magnis ova-

libus flavidis, ornatum. Vena costali pallide flava: pterostigma angustatum, infuscatum, nigro-venatum; cellulis areæ poststigmaticalis triseriatis. Cæteris ut in *S. sabulosa*. Long. corp. 20‴; exp. alar. antic. 40‴, postic. 36‴.

Hab. Champion Bay (*Du Boulay*). In my collection and in Brit. Mus.

The largest of the Australian species: the groove marking the divisions of the eyes is only slightly indicated, in fact, is less evident than in any other member of the group *Schizopthalmi* with which I am acquainted.

9. S. DIFFORMIS, n. sp. Antennæ nigræ; dimidio inferiore clavæ flavo. Frons niger, griseo-villosus. Clypeus, labrum, marginesque oculorum flavi. Vertex niger, nigro-villosus. Thorax latus, niger, subtus griseo-villosus. Pedes nigri, tibiis extus flavis. Abdomen nigrum, gradatim attenuatum, infra ad basin flavo-notatum, marginibus posterioribus segmentorum, supra interruptis, apicem versus obsoletis, 2° infra late, flavo-marginatum. Alæ valde inæquales; posticæ conspicue breviores, prope basin latiores, ad apicem subangulatæ; humeris sordide flavis; pterostigmate brunneo, nigro-venato; cellulis areæ poststigmaticalis paucis, magnis, biseriatis. Long. corp. 13‴; exp. alar. antic. 26‴, postic. 20‴.

Hab. South Australia (*C. A. Wilson*). In my collection.

A peculiarly formed species, the great inequality in the size of the wings and the shape of the body giving it a facies different from the allied forms of the same local group. I believe my example to be a male.

The distribution of the colours of the legs is a good *prima facie* character whereby to separate the Australian species.

Malayan Archipelago.

10. S.(?) MALAYANA, nov. sp. Antennæ piceæ, vel piceo-nigræ, ad basin pallidiores; clava rufo-picea, ad basin nigra. Frons intense nigro-villosus. Thorax supra griseus, utrinque et antice niger; infra fuscescens, cano pilosus, utrinque late sed indistincte flavo-bistrigatus. Pedes flavidi; tibiis piceis; tarsis nigris. Abdomen tenue, supra brunneum, infra basin versus albo-pruinosum. Alæ vitreæ, anticæ posticis valde longiores: sat latæ, paullo in medio dilatatæ; venis venulisque nigris; pterostigmate flavido, nigro-venato; areæ poststigmaticalis cellulis biseriatis, paucis, magnis. Long. corp. 18‴(?); exp. alar. antic. 31–34‴, postic. 26–28‴.

Hab. Celebes (*Wallace*). In the British Museum.

The extreme apex of the abdomen is broken off in the two specimens I ned; both appear to be males. In the

disparity of the size of the wings the species approaches *S. dif-formis*. The position of the insect is yet doubtful.

New Caledonia.

11. S.(?) CALEDON, nov. sp. (Antennæ mutilatæ). Frons fuscu griseo-villosus, inter antennas nigro-villosus; clypeo, labro, margini busque oculorum, flavo-ochraceis. Vertex griseo-villosus. Thora abdomenque supra fusci, infra griseo-pruinosi. Pedes nigri; femo ribus piceis. Alæ sat latæ, subæquales, sed posticæ anticis bre viores; humeris flavo-fuscis; pterostigmate fusco-nigro: cellulis are poststigmaticalis triseriatis. Long. corp. 13‴; exp. alar. antic. 34 postic. 30‴.

Hab. New Caledonia. In my collection and in that of Baron d Selys Longchamps.

Africa.

12. S. (?) CEPHALOTES, nov. sp. Caput, cum oculis, permagnum Antennæ nigræ, articulo basali ochraceo. Frons fuscus, clype labro, lateribusque flavis. Vertex nigro-villosus. Thorax sup griseo-fuscus, infra utrinque ochraceus, cano-villosus. Pedes nigr femoribus vix nigro-piceis. Abdomen breve, nigrum, infra utrinqu aurantiaco-maculatum. Alæ sat latiores, vix dilatatæ; pterostig mate intense nigro: posticæ anticis valde breviores; area costa ad basin paullo gradatim dilatata. Long. corp. 11‴; exp. ala antic. 33‴, postic. 25‴.

Hab. Madagascar. In my collection.

Seems to be more allied to *S. Caledon* than to the other Africa species.

13. S.(?) ABDOMINALIS, nov. sp. Antennæ piceæ; clava nigra, fl vido-annulata. Frons flavidus, nigro-villosus. Vertex nigro-vi losus. Occiput sordide flavidum. Thorax supra saturate gris ochraceus, antice et in medio nigro-notatus, fusco-villosus, inf pallidior. Pedes nigri: femoribus flavis, ad apicem nigris, pro basin fusco-cingulatis. Abdomen attenuatum, subcylindricum, pe elongatum (alis valde longius), nigrum, basin versus sordide ochr ceum, fusco-varium, spinis brevibus utrinque dense instructum. Al elongatæ, angustatæ, haud dilatatæ; pterostigmate nigro-fusco, nigr venato; area poststigmaticali infuscata. Long. corp. 20‴; exp. ala antic. 32‴, postic. 26‴.

Hab. Gaboon. One ♂ in my collection.

A second example in the Oxford Museum, perhaps a ♀, diffe in the wings being much clouded all over with smoky brow The underside of the thorax and base of the abdomen is of pale salmon-colour.

14. S. (?) AFRICANA, nov. sp. (Bubo festivus, *Ramb. Névrop.* p. 356, part.) Antennæ nigræ; clava lurida. Frons flavidus, cinereo-villosus. Vertex fusco-villosus. Occiput piceum, in medio nigrum. Thorax supra griseo-fuscus, utrinque niger, griseo-villosus; lineis indistinctis pallidis: infra pallidior, cano-villosus, linea utrinque flavida. Pedes pallide flavidi; tibiis ad basin apicemque et in medio fusco-semicinctis; tarsis nigro-annulatis. Abdomen attenuatum, infuscatum, supra ad basin rubidum, infra ad basin utrinque vitta flava notatum; apice nigro-hirsuto. Alæ vitreæ; pterostigmate pallide brunneo; venis venulisque fuscis. Long. corp. 14‴; exp. alar. antic. 27‴, postic. 23‴.

Hab. Gaboon, Madagascar.

The individual from the Gaboon is in my collection. I cannot separate it specifically from the old specimen, said to be from Madagascar, that is one of Rambur's types of *festivus.* My individual is certainly a ♂, and hence cannot be an *Encyopoeis.* It is possible there may exist another African genus, and that in it should be placed *Suphalasca africana, Encyopoeis rufopictus, E. longistigma,* and *E. festivus.*

Genus BUBO, *Rambur.*

Wings elongate, narrow, scarcely dilated; the extreme base of the inner margin of the anterior wings with a semicircular excision, the axillary angle being somewhat produced: transverse branch of the lower cubitus confluent with the postcosta in all the wings.

Antennæ much shorter than the wings, straight; club broadly pyriform, almost truncate.

Eyes with the lower division one-half smaller than the upper.

Thorax villose.

Abdomen short: appendices of the ♂ long, twisted, geniculate, with a process in the middle.

Legs with the spurs of the posterior tibiæ as long as the first two tarsal joints.

Hab. Spain, Syria, Egypt, &c.

Species.

1. B. AGRIOIDES, *Rambur.* (Ascal. agrioides, *Ramb. In. Andalus.* pl. ix. fig. 2.—Bubo agrioides, *Ramb. Névrop.* p. 353.)
Hab. Spain.

2. B. HAMATUS, *Klug.* (Ascal. hamatus, *Klug, Symb. Phys.* iii. tab. xxxxvii. fig. 10.—Bubo hamatus, *Ramb. Névrop.* p. 354.—A. forcipatus, *Eversm. Bull. Mosc.* xxiii. p. 280, tab. v. fig. 4.)

Hab. Egypt, Syria, South Caucasus, Persia.

Genus Theleproctophylla *, *Lefebvre*.

Wings rather narrow, slightly dilated in the middle, not appendiculate; the posterior pair much smaller than the anterior; network open; transverse branch of the lower cubitus confluent with the postcosta.

Antennae one-fourth shorter than the wings, without verticillate hairs in the basal portion; club short and subtriangular; a very dense tuft of hairs between the basal joints and on the face.

Eyes with the lower division one-half smaller than the upper.

Thorax slightly villose.

Abdomen short, in the ♂ furnished with two long, hairy, forcipate, superior appendices, provided internally with a tooth in the middle; and two short and stout, hairy, inferior appendices; in the ♀ with a pair of very large, curved and foliaceous (deciduous?), membranous, superior appendices, and two very short, hairy, inferior appendices.

Legs with the spurs of the posterior tibiæ about the length of the first tarsal joint.

Hab. Coast of the Mediterranean.

The single and familiar species of this genus bears, in the formation of its eyes and abdominal appendices, and in the shortness of the tibial spurs, characters so [illegible] as to preclude the possibility of [illegible].

Species.

1. T. barbara, *L.* — Myrmeleon barbarum, L. Syst. Nat. [illegible] — Ascal. barbarus, Fab. Syst. Ent. [illegible] — A. australis, Fab. Mant. Ins. [illegible] — [illegible] *Fauna* [illegible] *Faun.* [illegible]

Genus [illegible]

Wings [illegible] base of the inner margin of the anterior [illegible] a slight excision, [illegible] branch [illegible] wings.

* [illegible]

Antennæ much shorter than the wings; those the ♂ much twisted in the apical half, and subserrate internally in that portion; those of the ♀ nearly straight, and not serrate: club shortly capitate.

Eyes with the lower division much smaller than the upper.

Thorax scarcely villose.

Abdomen moderate: in the ♂ with a pair of short, cylindrical, forcipate appendices, which are strongly spiny within.

Legs with the spurs of the posterior tibiæ about equal to the first two tarsal joints.

Hab. North India.

Allied to *Bubo*; differing in the form of the ♂ antennæ and of the anal appendices.

Species.

1. S. NIMIUS, *Walker*. (Ascal. nimius, *Walk. Cat. Brit. Mus. Neurop.* p. 429, ♂.—A. luctifer, *Walk. op. cit.* p. 432, ♀.

Genus HELICOMITUS, n. g.

Wings as in *Bubo*, but with the axillary angle of anterior pair scarcely evident.

Antennæ shorter than the wings; in the ♂ irregularly sinuous in the basal half; small tufts of hairs on the outer side of the basal portion; club shortly capitate.

Eyes with the lower division one-half smaller than the upper.

Thorax scarcely villose.

Abdomen slender, rather long, and without appendices in the ♂; somewhat short in the ♀.

Legs with the spurs of the posterior tibiæ as long as the first tarsal joint.

Hab. North India, China.

Allied to *Bubo* and *Siphlocerus*; differs from the latter in having no abdominal appendices, and in the form of the ♂ antennæ.

...ies.

... H. INSIMULANS, ... simulans, *Walk. Cat. Brit.* *Neurop.* p. 42...

...akes no m... conformation of the

...: ... ...ese organs unna-

flavo-albidus, cinereo-villosus. Vertex fusco-villosus. Occiput flavo-albidum, supra in medio flavum. Thorax flavus, supra vittis tribus, infra strigis tribus obliquis, nigris, ornatus. Pedes flavi; tarsis nigris. Abdomen supra aurantiacum, vitta utrinque dentata, marginibusque segmentorum, nigris, maculis geminatis flavis; infra ad basin flavum; vitta mediana lanceolata nigra; ♂ appendicibus flavis, spinis brevibus nigris vestitis. Alæ vitreæ; humeris radioque flavis; venarum venularumque cæteris, pterostigmateque, nigris. Long. corp. ♂ cum append. 15‴, ♀ 14‴; exp. alar. antic. ♂ 31‴, ♀ 38‴; postic. ♂ 26‴, ♀ 34‴.

Hab. Cape of Good Hope. The ♂ in my collection, the ♀ in that of the British Museum.

2. E. AMICUS, nov. sp. Antennæ nigræ, ad basin piceæ. Frons flavidus, flavo-villosus. Vertex fusco-villosus. Thorax flavus, supra vittis duabus nigris ornatus; infra flavidum, utrinque fuscescens. Pedes omnino flavi. Abdomen ad basin flavum, utrinque vitta nigra dentata ornatum. Alæ vitreæ; humeris, pterostigmate, subcosta, radio, cubitisque ad basin, flavis, venarum venularumque cæteris nigricantibus. Long. corp.? (abdomen mutilatum); exp. alar. antic. 34‴, postic. 29‴.

Hab. Natal. In De Selys's collection.

Closely allied to *flavilinea*. The single individual appears to be a ♀; but the abdomen wants all but the basal segments.

3. E. (?) RUFO-PICTUS, *Walker*. (Ascal. rufo-pictus, *Walk. Cat. Brit. Mus. Neurop.* p. 423.) Antennæ paullo flexuosæ, rufæ; clava nigra. Vertex occiputque rufi. Thorax obscure rufescens, infra griseo-villosus. Pedes rufi; tibiis ad basin, tarsisque nigris. Abdomen rufo-griseum, supra maculis utrinque nigris. Alæ fere vitreæ, vix flavido-tinctæ; pterostigmate magno, rufo; venis venulisque flavidis (♀). Long. corp. 15‴; exp. alar. antic. 38‴, postic. 34‴.

Hab. Sierra Leone (*Morgan*).

I think this species belongs to the genus, though certainty is not obtainable without seeing the ♂.

4. E. (?) LONGISTIGMA, nov. sp. Antennæ nigræ vel piceo-nigræ. Frons rufo-ochraceus, aureo-villosus. Thorax sordide ochraceus, fusco-signatus. Pedes nigri; genibus testaceis (♀). Abdomen breve, obesum, fuscum; vitta dorsali ventralique rufo-ochracea, nigro-interrupta. Alæ pallide fulvo-tinctæ; cellulis plurimis saturatiore fulvo pupillatis; pterostigmate perelongato, piceo-nigro; area postigmaticali cellulis paucis, magnis, instructa; anticæ in medio paullo dilatato, basi gradatim angustiores; posticæ fere dimidio angustiores, su Long. corp. 10‴; exp. alar. antic. 31‴, postic. 26‴.

Hab collection.

A decidedly aberrant species; yet, from an examination of the ♀ only, it cannot be located in any other group.

5. E. (?) FESTIVUS, *Rambur*. (Bubo festivus, *Ramb. Névrop.* p. 356, part.) Antennæ rufescentes vix obscure annulatæ, ad basin flavidæ: clava nigra. Frons occiputque flavi, ille cano-pilosus. Thorax supra niger, vittis tribus, quarum una mediana unaque utrinque, flavis, ornatæ. Pedes omnino flavi. Abdomen flavum, utrinque nigro-maculatum fere vittatum, infra vitta mediana nigra signatum. Alæ vitreæ; subcosta radioque flavidis, venarum venularumque cæteris nigricantibus; pterostigmate brunnescente, nigro-venato. Long. corp. 10–12'''; exp. alar. antic. 29–30''', postic. 24–25'''.

Hab. Senegal.

This diagnosis has been made from Rambur's Senegal types. Rambur considered he had both sexes. The two Senegal types present very great differences in the form of the abdomen, one having that part small and shrunken, the other very obese. If they be really ♂ and ♀, then the insect cannot be an *Encyoposis*; for the smaller one (♂?) has no appendices. The type from Madagascar is a different species, which I cannot separate from my *Suphalasca* (?) *africana* (vide antè, p. 259).

Genus OGCOGASTER, *Westwood*.

Wings broad, dilated in the middle; the extreme base of the inner margin of the anterior pair with an excision, not appendiculate: network open; branch of the lower cubitus confluent with the postcosta in all the wings.

Antennæ much shorter than the wings, straight, without hairs at the base; club broadly capitate.

Eyes very large; the upper division much larger than the lower.

Thorax slightly villose.

Abdomen shorter than the wings, subcylindrical in the ♂, appendices long and cylindrical, directed downwards and forcipate: strangled at the base, and afterwards very obese in the ♀; with bright and varied markings.

Legs with the spurs of the posterior tibiæ equalling the first tarsal joint.

Hab. India.

The ♂ appears to be scarce: I have only seen that of *O. segmentator*. The ♀ abdomen, although so conspicuously large when gravid, shrinks to a size equal to that of the ♂ when the ova are deposited.

Species.

The two species are sufficiently recognizable from Westwood's description and figures.

1. O. TESSELLATA, *Westwood.* (Ascal. (Ogcog.) tessellatus, *West. Cab. Oriental Ent.* pl. xxxiv. 1.)
Hab. India.

2. O. SEGMENTATOR, *Westwood.* (Ascal. (Ogcog.) segmentator, *West. op. cit.* pl. xxxiv. fig. 2.)
Hab. India.

Genus ACHERON, *Lefebvre.*

(Hybris, part., *Hag.*)

Wings elongate, dilated in the middle, especially in the ♀; the extreme base of the inner margin of the anterior pair with an oblique excision, followed by a slight dilatation, but not appendiculate: network rather dense; branch of the lower cubitus confluent with the postcosta in all the wings. Pterostigma large, the apical side extended and very oblique.

Antennæ shorter than the anterior wings, with a slight bend in the basal portion in the ♂, and the apex bent downwards; *denticulate internally at the base*; club broadly pyriform.

Eyes with the upper division rather larger than the lower.

Thorax scarcely villose.

Abdomen very long in the ♂, much longer than the wings; shorter in the ♀, slender and laterally compressed in both sexes; appendices absent.

Legs with the spurs of the posterior tibiæ scarcely longer than the first tarsal joint.

Hab. North India and China.

The ♂ is readily distinguished by the great length of the abdomen, absence of appendices, and the denticulate base of the antennæ; the ♀ is much allied to that of *Hybris*, and is not readily separable therefrom; the broader wings, and longly extended pterostigma of the anterior pair, and the somewhat dilated base of the costal area in the posterior pair, are the most evident characters.

Species.

1. A. LONGUS, *Walker.* (Ascal. longus, *Walk. Cat. Brit. Mus. Neurop.* p. 435, ♂.—A. trux, *Walk. op. cit.* p. 432, ♂.—A. loquax, *Walk. op. cit.* p. 434, ♀.—A. anticus, *Walk. l. c.* ♀.)

Walker's several species appear to me to be all forms or sexes

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] have been [illegible] a re[illegible] there are [illegible] the [illegible] in [illegible]

The wings vary much in tinting in different individuals, and certainly independently of species. At present I can separate only three specific forms, as under:—

1. H. JAVANA, *Burmeister*. (Ascal. javanus, *Burm. Handb.* ii. p. 1001.) Pedes nigri. Appendices maris breviores, cylindricæ, forcipatæ, ad apicem vix incrassatæ, nigræ, ad basin piceæ, pilis spiniformibus nigris vestitæ.

Hab. Malay archipelago.

2. H. SUBJACENS, *Walker*. (Ascal. subjacens, *Walk. Cat. Brit. Mus. Neurop.* p. 431 (♀).—A. remotus, *Walk. op. cit.* p. 447 (♀).—Bubo javanus, *Ramb. Névrop.* p. 355, nec *Burm.*?) Major. Pedes rufescentes. Appendices maris longiores, cylindricæ, robustæ, forcipatæ, rufescentes, pilis spiniformibus nigris vestitæ.

Hab. China; Japan; Formosa.

Larger than *javana* and separable especially by its reddish legs and the much longer and stronger appendices of the ♂.

Remota is placed in the *Holophthalmi* by Walker; but the type is a much damaged individual (absolutely specifically identical with that of *subjacens*), in which the eyes are mutilated through one division having been removed!

Rambur gives no locality for his *javanus*. Judging from the colour of the legs and appendices, I consider that his species is probably *subjacens*. I have seen individuals of the genus *Hybris* from various islands of the Malay archipelago that I consider to be the true *javana*, and all have black legs and appendices.

3. H. ANGULATA, *Westwood*. (Ascal. (Ogcog.?) angulatus, *Westwood, Cab. Or. Ent.*—Ascal. accusans, *Walk. Cat. Brit. Mus. Neurop.* p. 431.) Magnitud. *H. subjacentis*. Alæ latiores. Pedes piceonigri. Appendices maris breves, haud forcipatæ, intus concavæ, rufæ, ad apicem spinis brevibus nigris dense instructæ.

Hab. Assam; Silhet.

A broader-winged insect with very differently formed appendices. The colour of the dorsum of the abdomen is of a much brighter red than in the allied species.

4. H. (?) CERVINA, *Hagen*. (Ascal. cervinus, *Hag. Verh. zool.-bot. Gesell. in Wien*, 1858, p. 481.)

Hab. Ceylon.

Unknown to me. It … *tobasis*, only that Hagen
…g the wings … teriorum basali angu-
…will scarc… …ndiculate wings of

Genus Glyptobasis, n. g.

(Ogcogaster, part, *Westwd.*, *Hag.*)

Wings elongate, much dilated in the middle, narrow at the base: network rather close; branch of the lower cubitus confluent with the postcosta in all the wings: anterior pair appendiculate.

Antennæ rather shorter than the wings; in the ♂ slightly bent at the base, and in that portion each joint is furnished with a small sharp tooth or spine; club in the form of a short truncate cone.

Eyes with the upper division rather larger than the lower.

Thorax slightly villose.

Abdomen rather shorter than the wings, marked with bright colours; that of the ♂ slender, with a pair of claw-shaped corneous appendices; more robust in the ♀.

Legs with the spurs of the posterior tibiæ nearly equalling the first two tarsal joints.

Hab. India.

Species.

I am unable to diagnose the forms in an intelligible manner. It is evident that several species exist, presenting special characters in the appendices of the ♂, independently of general peculiarities. As in several other genera, the males seem to be much rarer than the females, or their habits cause them to be less frequently captured; hence much difficulty arises. The following separation of described species will probably be found tolerably correct. The wings, as in *Acheron* and *Hybris*, certainly acquire an amount of tinting varying according to the maturity of the individual.

1. G. dentifera, *Westwood.* (Ascal. (Ogcog.) dentifer, *Westw. Cab. Or. Ent.*)

I possess several examples from Bombay that are certainly referable to this species.

2. G. incusans, *Walker.* (Ascal. incusans, *Walk. Cat. Brit. Mus. Neurop.* p. 412, ♂. A. nugax, *Walk. op. cit.* p. 433, ♀?)

Hab. Ceylon.

G. incusans is certainly distinct from [illegible] nugax may be the female of it is probable from [illegible]

Genus Nephoneura, n. g.

(Proctarrelabris, part. *Lefebv.*?)

Wings elongate and rather broad; anterior pair narrow at the base and appendiculate; posterior pair longly and shallowly excised on the inner margin: network moderately dense; branch of the lower cubitus in the posterior wings confluent with the postcosta.

Antennæ considerably shorter than the anterior wings, strong, straight, the base furnished with verticillate hairs; club shortly and broadly pyriform, almost truncate; a dense tuft of hairs on the face and between the antennæ.

Eyes with the divisions nearly equal.

Thorax robust, slightly villose above and densely so on the breast.

Abdomen shorter than the wings; in the ♂ furnished with long, forcipate, terminal, simple appendices.

Legs with the spurs of the posterior tibiæ scarcely exceeding the first tarsal joint.

Hab. South Africa.

Species.

1. N. capensis, *Fab.* (Ascal. capensis, *F. Spec. Ins.* i. p. 400; *Ent. Syst.* ii. p. 96.) Frons vertexque dense cinereo-brunneoque pilosi. Antennæ rufæ, pallido annulatæ; clava nigra. Thorax fusco-testaceoque varius; infra linea utrinque albida. Pedes rufo-picei; tibiis ad basim apicemque, et in medio, flavo-semicinctis. Abdomen fuscum; marginibus posticis segmentorum, supraque maculis obliquis, nigris. Appendicibus ♂ rufescentibus, intus breviter nigro-spinosis. Alæ hyalinæ, longitudinaliter brunneo-strigatæ; maculis in area subcostali, marginibusque venularum costalium, rosaceis; venis principalibus rufescentibus, venulis nigris, plerumque brunnneo-nebulosis vel marginatis; pterostigmate rufescente. Long. corp. 13‴; exp. alar. antic. 32‴, postic. 27‴.

Hab. Cape of Good Hope. In my collection and in Brit. Mus.

This is certainly the true Fabrician *capensis*, according to the type in the Banksian Collection now in the British Museum. Fabricius does not mention the appendiculate wings, and his description fails to indicate the rosy markings; but the description was drawn up fro[illegible] led example.

[illegible] ollusor, nov. [illegible] a, differt alis haud strigatis, (costalibus c [illegible] ; maculis subcostalibus [illegible] is; tibi [illegible] ido, vix interrupto:

alæ posticæ ♀ nebula magna paullo ante apicem fusco-testacea ornatæ.

Hab. Cape of Good Hope. In my collection and in Brit. Mus.

Genus PROCTARRELABRIS, *Lefebvre* (restricted).

(Bubo, part., *Rambur*, *Hag.*)

Wings rather broad; anterior pair with a small concave excision at the extreme base of the inner margin, followed by a slight dilatation, but not appendiculate: network open; branch of the lower cubitus in the posterior wing confluent with the postcosta.

Antennæ rather shorter than the anterior wings, strong, nearly straight, the base furnished with verticillate hairs; club short and capitate; a dense tuft of hairs on the face and between the antennæ.

Eyes with the divisions equal.

Thorax robust, densely villose, especially on the breast.

Abdomen slender in the ♂, and furnished with long and slender, forcipate, simple, terminal appendices: shorter and very obese in the ♀.

Legs with the posterior tibiæ nearly equalling the first two tarsal joints.

Hab. South Africa.

Species.

1. P. ANNULICORNIS, *Burmeister.* (Ascal. annulicornis, *Burm. Handb.* ii. p. 1001.—Myrmeleon capense, *Thunbg. Nov. Act. Holm.*—Ascal. capensis, *Burm. op. cit.* p. 1002 (nec *Fab.*).—P. capensis, *Lefebr. Guérin's Mag.* 1842.—Bubo capensis, *Ramb. Névrop.* p. 351.—Ascal. involvens, *Walk. Cat. Brit. Mus. Neurop.* p. 422 (♀).)

Hab. South Africa.

This is the species that has been universally mistaken for the true *capensis* of Fabricius. I adopt Burmeister's name, though it is hardly applicable, as the antennæ are scarcely "annulate." It is, I think, also certainly Thunberg's *capensis*; his name is independent of that of Fabricius. It appears to be a common South-African species, and varies much in size and otherwise. The following conditions are known to me:—

1. Alæ fere vitreæ. ♂, ♀.
2. Alæ uniformiter pallide brunneo tinctæ. ♂.
3. Alæ posticæ nebula magna ante apicem, fuliginosa, ornatæ, ♀ (=*involvens*, Walker).
4. Alæ posticæ fere uniformiter pallide f[illegible]æ, ♀.

A note, in the handwriting of M. Guienzius, attached to an example from Natal in the British Museum, gives the following information respecting the habits of the species:—"Hides by day in the fissures of the bark of old trees, with the body curved upwards; difficult to find. In the morning and evening twilight it chases insects, dragonfly-like, around branches of trees."

Genus Helcopteryx, n. g.

(Bubo, *part.*, *Ramb.*, *Hag.*)

Wings elongate, rather narrow towards the base, the extreme base of the inner margin with a small excision followed by a slight dilatation, but not appendiculate: network dense; branch of the lower cubitus confluent with the postcosta in the posterior wings.

Antennæ considerably shorter than the wings, straight, the base furnished with verticillate hairs; club nearly roundly capitate; a dense tuft of hairs on the face and between the antennæ.

Eyes small; the divisions nearly equal.

Thorax robust, villose, especially on the breast.

Abdomen of the ♂ slender, as long as the anterior wings, the three terminal segments furnished with a narrow wing-like dilatation of the lateral margins, gradually becoming broader to the apex, which is furnished with short, straight and cylindrical divergent appendices; the second segment is dilated above into a hump posteriorly, giving the abdomen the appearance of being geniculate. In the ♀ the abdomen is simple, rather obese, excepting at the apex.

Legs with the spurs of the posterior tibiæ about the length of the first two tarsal joints.

Hab. South Africa.

Species.

1. H. rhodiogramma, *Rambur.* (Bubo rhodiogrammus, *Ramb. Névrop.* p. 355)

Hab. Cape of Good Hope; Natal.

Rambur's description is sufficiently precise, only that his type was a female. In the ♂ I d not see the "taches en forme de fer-à-cheval, d'un noir v ich he speaks. The ♂ abdo- n in two examples - uniformly fuscous, some- eddish above to vith a tendency to be- nose beneat second segment is

beset with short black spine-like hairs; the wing-like lateral dilatations of the three terminal segments are reddish brown; from the last segment beneath projects a triangular valve; the appendices brown, furnished with tufts of black hairs at the tips.

Genus PUER, *Lefebvre*.

Wings elongately subtriangular; costal margin not dilated at the base: network very open; transverse branch of the lower cubitus confluent with the postcosta in all the wings: posterior wings very much shorter than the anterior.

Antennæ shorter than the wings, nearly straight, simple; club very broad; face very densely villose.

Eyes having the upper division more than twice as large as the lower.

Thorax slightly villose above, more densely so on the breast.

Abdomen with dense tufts of hairs along the sides; ♂ without appendices: very short and broad in the ♀.

Legs with the spurs of the posterior tibiæ much shorter than the first tarsal joint.

Hab. South of France.

Species.

1. P. MACULATUS, *Olivier*. (Ascal. maculatus, *Oliv. Encyc. Méthod.* i. p. 246.—P. maculatus, *Ramb. Névrop.* p. 352, pl. ix. fig. 2.—A. niger, *Borkh. Scrib. Beitr.* ii. p. 156, tab. xi. fig. 2; *Burm. Handb.* ii. p. 1002.)

This beautiful insect seems to be confined to Provence and the neighbouring districts.

I know not for what reason Hagen (Stett. Zeit. 1860, p. 53) has deposed Olivier's name in favour of Borkhausen's; the former was published at least two years *before* the latter, and the description is quite satisfactory.

Genus ASCALAPHODES, n. g.

Allied to *Puer*. In the ♂ the antennæ have each joint internally, excepting those towards the apex, provided with a sharp, back-directed tooth; and the abdomen has a pair of short very stout appendices, the tips of which are thickened and approximate; the hairs of the abdomen are not arranged in tufts.

Hab. India.

Species.

1. A. CANIFRONS, *Westwood*. (Ascal. (Bubo) canifrons, *Westw. Cab. Or. Ent.* pl. xxxiv. fig. 3.)

Westwood's type is a ♀. A ♂ in the British Museum is much smaller (exp. alar. antic. 13‴), in fact the least of all the Ascalaphidæ; the posterior wings have the basal third opaque white, showing the affinity of the genus to *Ascalaphus* (restricted).

Genus Ascalaphus, *Fab.* (restricted).

Wings subtriangular, with yellow or white and black (often opaque) markings; costal margin dilated at the base, afterwards constricted; network very close: transverse branch of lower cubitus running obliquely into the inner margin, after the termination of the postcosta, in all the wings.

Antennæ strong, as long as the wings (or slightly longer or shorter), without hairs at the base; somewhat arcuate at the base, especially in the ♂: club short and broad, almost truncate: a dense tuft of hairs between the antennæ and on the face.

Eyes having the superior division much larger than the inferior.

Thorax villose.

Abdomen short and densely villose, obese in the ♀; in the ♂ with a pair of slender, cylindrical, forcipate terminal appendices.

Legs very short, with the spurs of the posterior tibiæ scarcely so long as the first tarsal joint.

Hab. Mediterranean district; extending into Central Europe and Siberia.

The striking and papilioniform species of this genus are familiar to every entomologist.

Species.

I content myself here by enumerating the species according to Hagen's list in the 'Stettiner entomolog. Zeitung' for 1860, pp. 47, 48, without reproducing the complicated synonymy he there elucidates, and which I have not yet tested. However, I have united *corsicus* and *siculus* of Rambur, not being able to find any character whatever, after an examination of the type specimens, by which to distinguish them. The species appear to separate themselves into two ill-defined groups, characterized by the presence or absence of opaque coloration of the wings: many of them are closely related one to another, and seem to thoroughly confirm my opinion expressed in the introductory portion of this paper, that local influences tend to produce modifications or "local species" in the Ascalaphidæ.

Hagen recognizes the following, most of which I have seen:—

1. A. MACARONIUS, *Scop.* (*Ent. Carn.* p. 168, fig. 446; *Papilio*!)
Hab. Austria, Dalmatia, Hungary, Turkey, Russia.

2. A. KOLYVANENSIS, *Laxmann* (*Nov. Comment. Acad. Petrop.* xiv. p. 599, tab. xxv. fig. 9).
Hab. Russia, Asia Minor, Turkey, Greece, Hungary, Dalmatia, &c.

3. A. PUPILLATUS, *Ramb.* (*Névrop.* p. 346, pl. x. fig. 7).
Hab. South Russia and Hungary.

4. A. LONGICORNIS, *Linn.* (*Mus. Lud. Ulr.* p. 402).
Hab. France (extending northwards to Paris), Spain, Algiers, Italy, &c.

5. A. RHOMBOIDEUS, *Schneider* (*Stett. ent. Zeit.* 1845, p. 153).
Hab. Rhodes, Hungary.

6. A. COCCAJUS, *Wiener Verzeichniss*, p. 187 (Papilio!).
Hab. Germany (extending northwards to Thuringia); Switzerland; France, Spain, Italy, Greece.

7. A. BÆTICUS, *Ramb.* (*Névrop.* p. 345).
Hab. Andalusia.

8. A. LACTEUS, *Brullé* (*Exp. Morée*, p. 278, tab. xxxii. fig. 3).
Hab. Greece, Turkey, Asia Minor, Dalmatia, Italy, South Russia.

9. A. ITALICUS, *Fab.* (*Spec. Ins.* p. 400).
Hab. Italy, Sicily.

10. A. SIBIRICUS, *Eversm.* (*Bull. Moscou*, xxiii. p. 279, tab. v. fig. 2).
Hab. Kiachta, Mongolia.

11. A. ICTERICUS, *Charp.* (*Hor. Ent.* p. 59).
Hab. South France, Portugal, Spain, Algiers, Barbary, Italy, Sicily, Greece.

12. A. HISPANICUS, *Ramb.* (*Névrop.* p. 350, pl. ix. fig. 4).
Hab. Spain.

13. A. USTULATUS, *Eversm.* (*Bull. Moscou*, xxiii. p. 278, tab. v. fig. 4).
Hab. South Caucasus.

14. A. CORSICUS, *Ramb.* (*Névrop.* p. 349, pl. xi. fig. 3), = siculus, *Rbr.*
Hab. Corsica, Sardinia, Sicily, Greece.

15. A. SYRIACUS, nov. sp. Antennæ nigræ. Frons griscescenti-villosus. Vertex nigro-villosus. Thorax niger, supra aurantiaco-sexmaculatus, infra flavo-maculatus. Pedes flavi: femorum dimidio basali, tibiis ad apicem, tarsisque nigris. Abdomen nigrum. Alæ anticæ hyalinæ, nitidæ, parte tertia basali lactea, extus convexa, macula ad basin nigro-fusca, venis venulisque plerumque albis vel flavidis, cubito superiori

nigro; pterostigmate lacteo: posticæ fere æqualiter tricoloratæ, nitidæ, ad basin nigro-fuscæ, in medio lacteæ, pallide venatæ; ad apicem omnium fuliginosæ, nigro-venatæ; pterostigmate fusco (♂). Long. corp. 9‴; exp. alar. antic. 18‴.

Hab. Syria (Huleh, *Lowne*).

Of the group of *A. lacteus*, Brullé, but very distinct from any described species; the uniformly fuliginous apical third of the posterior wings is especially characteristic; this colour is somewhat irregular within, and is carried as a narrow and gradually diminishing line some little distance along the inner margin.

INDEX TO SPECIES.

The names *in italics* indicate synonyms: the other names are those that I consider should be applied to the species; but some of these it is not possible to identify, and they are merely cited as guides to future workers.

N.B. The names of the species of the genus *Ascalaphus* (*sensu stricto*), and their synonyms, are not included in this index (*cf. antè*, p. 273). Neither is any notice taken of the numerous Catalogue and Museum names cited by Hagen ('Hemer. Synop. Synonymica'), it being considered that the perpetuation of such names is not only useless, but also pernicious.

Notes on the Geographical Distribution and Dispersion of Insects; chiefly in reference to a Paper by Mr. ANDREW MURRAY, F.L.S., "On the Geographical Relations of the Chief Coleopterous Faunæ" (Journ. Linn. Soc. vol. xi. (Zoology), No. 49.). By ROLAND TRIMEN, F.L.S., F.Z.S., M.E.S.

[Read April 20, 1871.]

HAVING attentively perused the above-mentioned treatise, I think that the following notes may perhaps be useful. I must

premise that they have nothing specially to do with the distribution of Beetles (a subject which Mr. Murray handles with his wonted care and skill), but refer only to some matters of more general import incidentally touched upon in the paper.

The drift of Mr. Murray's main argument (as summarized at p. 7) is to account for the greater part of the difficulties presented by the known existing distribution of animals and plants over the globe, by the simple explanation of "continuity of soil at some former period." While all will admit that very great changes have taken place in the relative extent and position of land and sea during various periods of the past, I think that I concur with many naturalists, when I venture to express the opinion that too frequent recourse has been had of late to that broad and general admission as a mode of solving the difficulties in question, and that a rather wholesale creation of ancient continents has been the result. The process of disposing of such problems by "calling up" connecting lands "from the vasty deep," in which it is assumed they have been submerged, has doubtless something attractive about it, and it possesses the manifest advantage of affording the fanciful geographer an inexhaustible field wherein to disport himself,—

"The world is all before him, where to choose."

In saying this, I have no wish to undervalue the importance of the influence on distribution necessarily exercised by changes in the level of the land, there being so many facts only explicable on the admission of those changes; but I think that great caution should be exercised in assuming the former existence of great connecting stretches of land in order to account for cases of generic or specific affinity at distant points of the earth's surface.

Mr. Murray's avowed inclination in favour of the "continuity" theory appears to me to make him attach too little importance to other means of dispersal, particularly in the case of oceanic islands *. I do not propose here to recapitulate Mr.

* The oceanic islands (at least those of the Atlantic) are regarded by Mr. Murray as the remains of submerged tracts of land; but those who have visited such islands will generally, I think, recognize the force of the following significant observation of Mr. Darwin (Orig. of Spec. 4th edit. p. 427), viz.:—"Nor does the almost universally volcanic composition of such islands favour the admission that they are the wrecks of sunken continents; if they had originally existed as mountain-ranges on the land, some at least of the islands would have

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Following in Mr. Darwin's wake, he clearly shows how easily and promptly unoccupied ground is seized upon by immigrants, and how extremely difficult, on the contrary, it is for a foreign form to effect an entrance, and still more to establish itself, on land already well occupied. Oceanic islands are notoriously poorly stocked, while Europe, for by far its greater portion, is rich in flourishing forms; so that, allowing the available means of transport to and from Madeira to be equally great, it was scarcely to be expected that Madeiran special forms should have the same force to accomplish a permanent settlement on European soil as continental species would possess to naturalize themselves on the island.

I regret that, on the two occasions on which I landed at Ascension, my time was too limited to make any but the most superficial exploration of a small portion of its area. I observed no terrestrial animals of any sort, with the exception of thousands of *Musca domestica* and its allies *M. vomitoria* and *M. Cæsar*, and a few of *Dermestes lardarius*, all four such devoted followers of mankind, that it is safe to regard them as introductions. I was, however, informed by a resident that butterflies were occa-

been formed, like other mountain-summits, of granite, metamorphic schists, old fossiliferous or other such rocks, instead of consisting of mere piles of volcanic matter." I notice a remark recently published ('Nature,' Dec. 22, 1870, p. 149) by Dr. Hooker to the effect that the Seychelles group is formed of granite and quartz—a fact that widely distinguishes it from the Mascarene group of volcanic formation.

sionally seen *. Mr. Darwin has recorded (Nat. Voy. p. 587) that "a few grasshoppers occur a little inland at Ascension," and that "rats and land-crabs swarm in numbers." The island bears all the marks of having been the seat of volcanic action at a comparatively recent time; and the poverty of its fauna and flora may very probably be due to the shortness of the period during which it has been in a condition fit for the reception and support of organic life, as well as to its very restricted area. Sea-birds are very numerous, and some of them, I was told, nest on the island. The marine fauna, from the little that I could observe of it, struck me as one that would repay a systematic research. I believe that both the mollusks mentioned by Mr. Murray (p. 15), certainly the *Nerita*, were among those which I found crawling in abundance on the rough tufa-rocks near the turtle-ponds, and subsequently presented to the British Museum. A bivalve, which appeared to be a true oyster, was plentiful just about the water-line; and numerous shells of other mollusca, bleached to whiteness, lay in the rock crevices; while the general abundance of that class of animals was amply evidenced by the long beach of the well-known "Ascension sand," which appeared to consist solely of rolled and polished fragments of shells. Several splendidly coloured fish, resembling *Acanthurus*, were taken by the hook over the side of the steamer at her anchorage; and many others could be discerned in the clear water near the shore, as well as companies of gaily striped and spotted small species in the turtle-ponds. But the most striking and active animal I noticed was a species of crab (of the genus *Ocypoda*?) which swarmed on the hot rocks, close to the sea, in the full sunshine. These crabs possess an amazing agility, reminding one in their actions of the quickest hunting spiders, and evade with remarkable success any attempt to seize them; I even found it difficult to strike them with a stick. Their colouring is protective, being a dark reddish-purple, thickly spotted with white, and nearly resembling that of the rocks which they frequent, the spots representing the numerous orifices in the porous tufa.

In reference to St. Helena, Mr. Murray observes (p. 22):

* I remember to have read, in an account of a visit to Green Mountain (upon which I cannot now lay my hand), that variegated reddish butterflies were observed on the ascent. In all probability these were *Pyrameis Cardui*. Green Mountain has on it a scanty native vegetation, as well as introduced vegetables and garden-flowers.

"The butterflies seem as badly represented as the birds; and I would recommended to the consideration of the advocates of introduction by chance dispersal the fact that the two classes of animals best provided with means of dispersal are precisely those which, along with the mammals, are least represented. I can find no published notice of any Lepidoptera in St. Helena. No specimens of any exist in the British Museum; and the solitary species that I can learn by inquiry to have been met with is the *Cynthia Cardui*." On this I wish to remark that, on the 1st August 1859, in a garden towards the higher part of the valley in which James Town is situated, I captured, during less than half an hour, five species of Lepidoptera, and secured the larva of a sixth species. Concerning these, I find in my journal that *Danais Chrysippus* and *Pyrameis Cardui* were abundant, *Lycæna bætica* common, *Hymenia recurvalis* not uncommon, and *Botys otreusalis* "in hosts." The larva was that of a Quadrifid Noctua, and resulted in *Achæa Melicerta*, Drury; it was resting on a grass (*Coix lachryma*) known as "Job's Tears." A fourth butterfly, *Diadema Misippus* (*D. Bolina*, auct.), I found among the relics of the Burchell Collection, so religiously preserved at Oxford by Professor Westwood. The three butterflies taken by myself have been recorded as inhabitants of St. Helena in my 'Rhopalocera Africæ Australis' (pt. i. pp. 90 & 121, and pt. [illegible] p. 237), and the *Diadema* in my paper "on Mimetic Analogies among African Butterflies," published in the 'Transactions of the Linnean Society' (vol. xxvi. pp. 501 & 513, *note*), where I show how curiously that butterfly's range corresponds with the distribution of its model, *Chrysippus*. In looking at this scanty list of species*, which I cannot doubt could be considerably increased by any collector resident in the island, it is very noticeable that all seven are prolific and widely dispersed insects†, whose present distribution evinces their special aptitude for seizing upon and persistently occupying new stations, and that they are thus the very description of forms which one would

* Godart states [illegible] M[illegible] [illegible] p. 7[illegible] [illegible] M. Bory de Saint-Vincent, [illegible] St. Helena [illegible] but some [illegible] of this report must be [illegible] before we can [illegible] to the Fauna of the island.

† *P*[illegible] *C*[illegible] and *H*[illegible] are found all over the world [illegible] range only [illegible] characterizes *L*[illegible] *M*[illegible] and *Lycæna bætica*. *Achæa Melicerta* is recorded from the Punjab [illegible] and Moreton Bay; and *B*[illegible] Congo and [illegible]

expect to be amongst the first to reach and colonize so isolated a spot as St. Helena.

The few insects of other orders known to me as natives of St. Helena are quite of the same stamp as the Lepidoptera as to likelihood of their having been introduced. The brilliant Sphex, *Chlorion compressum*, which I noticed on the walls in James Town, is a well-known native of India and Ceylon, and doubtless "came over" with its particular favourites, the cockroaches. *Gryllus capensis*, again (a St.-Helena specimen of which, in the British Museum, is recorded in the official 'Catalogue of Dermaptera Saltatoria,' pt. i. p. 16), is a cricket of world-wide distribution, being known to occur in Southern Europe, Western and Eastern Asia, every quarter of Africa, North and South America, Australia, the Philippine Islands, Borneo, and Mauritius.

As regards the Coleoptera of the island, I am not in a position to speak from personal observation; but it is clear, from Mr. Murray's own remarks and those which he quotes from Mr. Wollaston (pp. 22–24), that a very considerable proportion of the species may safely be regarded as introductions from other countries.

While touching on the subject of dispersal, I wish to observe that the frequent occurrence of insects out at sea, very far from land, scarcely receives the attention which it deserves, and that my own slight experience assures me that a careful record of instances of the kind would prove very instructive and valuable. In the journal of a voyage, made in the year 1858, from England to the Cape, I noted the various insects that made their appearance on board the ship in which I sailed. They were as follows (I add the date and approximate distance from the nearest land * in each case), viz.:—

1. *Pyrameis Cardui*. May 28th. About 90 miles west of Teneriffe.
2. A pale-yellow Moth, apparently a *Bombyx*, about the size of the Silkworm Moth (*B. Mori*). Same date and position.
3. *Botys sp. ignot.* June 5th. About 230 miles from the mouth of the river Gambia.
4. A small Longicorn Beetle (*gen. ignot.*). June 6th. About 230 miles from the mouth of the river Jeba.

* The distance is roughly calculated from the recorded position of the ship at noon on each of the days mentioned.

5. A large Sphinx (perhaps *Sphinx Convolvuli*). June 7th. About 420 miles from Sierra Leone.
6. *Sphinx Convolvuli*. June 8th. About the same distance from Sierra Leone as on the preceding day.
7. *Clytus sp. ignot.* (smaller than *C. Arietis*). June 26th. About 150 miles from Bahia.

In addition to the above, I occasionally saw large insects which I could not determine, but which I usually thought to be Sphinges of some description, whisk rapidly about the rigging, and was besides often told of "butterflies" and other insects noticed by the passengers and sailors. *Pyrameis Cardui* after settling for a few seconds on the binnacle, and *Sphinx Convolvuli* after hovering about some vegetables hanging in one of the boats amidships, alike sped away westward. On this voyage, it should be noted that the ship was a perfectly new one, and had never left England before.

A specimen of *Acridium peregrinum*, in the collection of the British Museum, is noted (Cat. Dermapt. Saltat. iii. p. 577) as having been taken "500 miles from land;" but the latitude and longitude are not mentioned.

The record of such occurrences of insects is much to be desired as an aid to better knowledge of the dispersal of species; and I would commend the subject to the attention of travellers across the ocean.

At p. 55, Mr. Murray notes what he considers "a very remarkable African affinity" in the Lepidoptera of Australia, in reference to the case of the larva of *Doratophora vulnerans*, Lewin. The instances which he cites as analogous, however, are very different in character; for he quotes the mention by Livingstone "of a caterpillar called *Rigura* producing fearful agony if a sore is touched *with its entrails*," and the statement made by Baynes and other travellers, that a caterpillar is used by the Bushmen to poison their arrows. It is evident that, if a caterpillar be used at all for poisoning arrows (concerning which report my inquiries have hitherto been attended by no satisfactory result), it must be the intestines or juices of the animal which are so employed. But the case of *Doratifera** *vulnerans* is the common one of (what appears to be mechanical) irritation by means of clusters of spines, a defence possessed by many caterpillars, not only in Australia and South

* The name of the genus is thus given by Duncan and Walker.

Africa, but throughout the globe, and of which the larva of the European *Cnethocampa processionea* presents a familiar example. Duncan (Nat. Libr., Ent. vol. vii. Exotic Moths, pp. 181–2, pl. xxii. f. 5) represents the larva of *D. vulnerans* as possessing four fascicles of rufous spines, exsertile at will, on both the anterior and posterior portions of the body, and quotes Lewin to the effect that the wound *inflicted by the fascicles* is very painful. According to Mr. Murray's account it would appear that the African larvæ, from the handling of which Dr. Welwitsch experienced such suffering, were near allies (if not actually species) of *Doratifera*; and the conclusion is obvious that it was by fascicles of spines that the pain was occasioned—not an uncommon case in the warmer parts of the world, and one by no means indicative of any special relation between the Lepidopterous faunas of South-Africa and Australia.

In explaining the presence of a "Brazilian type" or "element" in the Coleopterous fauna of Western Africa, Mr. Murray (p. 63) states that this South-American relation "has also now been recognized in the Lepidoptera;" but he points out neither on what grounds, nor by whom, the recognition has been made. Among the *Rhopalocera*, I am not aware of any genus characteristic of Brazil that occurs in Western Africa*; unless, with Hopffer, we refer the species of Boisduval's genus *Crenis* to the genus *Eunica*, Hübner.

Referring to *Urania Rhipheus* of Madagascar, Mr. Murray observes (p. 68) that "it is an unusual thing at any time to meet with a gay-coloured Moth; but one with metallic brilliancy is still rarer." The former part of this remark certainly does not hold good, even with regard to Europe, when one recalls the *Deilephilæ* and other Sphinges, the "Burnets," the "Tiger Moths," the *Catocalæ*, the brightly tinted *Geometræ* of many genera, and various diurnal *Pyralidæ*; while, for metallic adornment, the *Plusiæ* and very many *Tineina* can be cited. But when we turn to tropical and subtropical regions, the proportion of brightly coloured moths is in nearly all groups greatly increased; and

* The Nymphalide genus *Eurema*, Doubl. (which is scarcely separable from *Pyrameis*), is common to both regions, and also inhabits the West Indies; but as there are three known African species to five American, it is difficult to assign the genus to either fauna. The genus *Acræa*, which has representatives in South-eastern Asia and in Australia; is specially African, and the South-American species belong to a very distinct section, which Mr. Butler (Cat. Fab. D. Lep. B. M. p. 128) separates as *Actinote*, Hübner.

most of these are diurnal in flight, and more than rival the majority of butterflies in their gorgeous hues; while whole families (*e.g.* the *Glaucopidæ*) glitter with metallic hues vying with those of humming-birds. I am at the same time disposed to indorse the judgment of Dr. Boisduval, M. Guenée, and Mr. Murray, that the preeminence for surpassing beauty of right belongs to *Urania Rhipheus*.

Looking, however, to Mr. Murray's argument of the evidence of a Brazilian element in the fauna of Madagascar afforded by the presence of *Urania*, it is well to bear in mind that such con- considerable differences (chiefly shown in the stages of larva and pupa) exist between *U. Rhipheus* and the allied Uranides in South America and the West Indies, that the eminent lepidopterist M. Guenée has not only separated it from them generically, but as the representative of the distinct family Uranidæ (Sp. Gen. Lep. t. ix. p. 10). Nor should it be lost sight of that, if the independent testimony of Drury * and Cramer is of any value, either *U. Rhipheus* or some very close ally inhabits South-eastern Asia. These statements of Indian and Chinese localities for the insect, considered in connexion with the well-known eastern stations of the allied genera *Alcidis* and *Nyctalemon* (of both which the earlier states are as yet unknown), seem to afford considerable ground for the opinion that the presence of *Urania* in Madagascar may eventually be proved to indicate an Asiatic rather than an American element in the island fauna.

Cape Town, Feb. 14, 1871.

* It is not necessary here to enter upon the moot question whether Drury's insect is to be regarded as a manufactured specimen, combining the head and body of *Papilio* with the wings of *U. Rhipheus*, or (as Mr. Butler suggests in Cat. Fab. D. Lep. B. M. p. 288) as a butterfly mimicker of the *Urania*, because in either case the presence of *Urania* in China or India, according to the ostensible *habitat*, has to be assumed.

Additional Note to p. 280. -Mr. J. C. Melliss, who has been a resident at St Helena for some years, informs me that Honey-Bees (*Apis*, sp.) and *Acherontia Atropos* were both common in that island for two or three years after his first arrival, but have since disappeared almost simultaneously. The same gentleman has shown me specimens of a Quadrifid Noctua, *Ophiodes Hottentota*, Guen., reared from larvæ in St. Helena: this moth is widely distributed in Southern Africa, and is nearly allied to the South-European *O. Tirrhæa*, Cram. R. T., 5th September, 1871.

season. On the horizon, in many directions, was what appeared to be forest, but turned out on examination to be only villages embowered in clumps of fruit-trees. I had many weary excursions over these dusty plains, exposed to a fierce sun, which was never clouded between his rising and setting, before I could discover a spot which seemed at all suitable for collecting in. This was at a village about twelve miles off, and beyond the limits of the Dutch territory, so that I had to obtain permission from the Sultan of Goa before I could reside in it. I spent two months there, suffering greatly from fever, but obtaining very fine collections in all departments of natural history, among which was the collection of Hymenoptera described by Mr. Smith in the 'Proceedings of the Linnean Society' (April 1858), and containing upwards of 100 species. After returning from the Aru Islands, eight months later, I collected in another locality, about twenty miles north of Macassar, near a range of limestone mountains, and in three months (August, September, and October, 1857) added largely to my collection of insects. I obtained here about 120 species of Hymenoptera, of

P. rugifrons, found in Ceram, was about two feet long, attached to the vertical trunk of a tree. When disturbed the ants rush out, and, turning the abdomen under the body, strike it against the firm papery nest, producing a loud rattling noise. This nest consisted internally of large irregular cells; and the inmates were not very numerous. It was the largest nest I observed of any species of this genus. *P. sexspinosus* forms a somewhat similar nest, but smaller, and attached to the surface of a large leaf. That of *P. textor* is of an open fibrous material, and only an inch in diameter. *P. Acasta* rolls up a leaf and forms within the cylinder a coarse papery nest. *P. Eudora*, of Batchian, was found under bark, with a nest consisting of a very few, small, imperfect, fragile cells, comprising in all only half a dozen individuals and about as many larvæ. *P. bihamatus*, and some other species, have their nest of a few exposed cells on the trunks of trees, and seem to exist only in very small communities. The other nests of ants of this genus observed by me were:—*P. rugifrons*, a soft papery nest on a smooth tree, about 12 inches long, with several

abundant, but sting very severely. *P. læviceps* was found under rotten bark. *P. maligna* was observed upon rocks in N. Celebes, carrying away Termites. *Amblyopone castanea* was found in abundance under rotten bark and fern-roots. The new genus, *Mesoxena*, was taken at night, visiting my sugar-jar.

We now come to the MYRMECIDÆ, the destroying ants "par excellence," and the most abundant in individuals of the whole group. The genus *Myrmica* consists chiefly of small red or yellow species, many of which are preeminently house-ants, and are a constant nuisance to the resident in the tropics. *M. ruficeps* and *M. pedestris* were found under rotten bark, almost solitary, and each with a few eggs. *M. pellucida* and *M. agilis* are small house-ants, and not very destructive. *M. vexator* and *M. vastator* well deserve their names. They swarm in houses almost everywhere, and, to the naturalist especially, are a constant source of trouble. Nothing but isolation by water, or, better still, by oil, will preserve any animal or vegetable substance from their attacks. They also sting most acutely, and

largest size and dragged them along, as if they were fatigued or wounded soldiers. This fact of the helplessness of these giant ants, and their very often having smooth toothless jaws, renders Mr. Bates's explanation of their probable function in the colony highly probable, viz. that they serve as mere baits to ant-eating animals, being naturally attacked and often carried off first, and thus allowing the working portion of the community to escape destruction. Another species, *P. plagiaria*, is small, but very active and voracious, and the large worker is only about twice as large as the small one. I observed them
white-ant's nest in a rotten tree, down which
ing in a continual stream, carrying away th
Termites. On another occasion they had
Coleopterous larva (*Passalus*, sp.), and hun
in dragging him out of his abode in a rotten

The genus *Solenopsis* very much resemble
species are generally red instead of brown or bl
lotes is one of the most abundant ants i
the most terrible pest. It forms its

tering houses from under the floors, and devouring every thing eatable. Its sting also is excessively painful, so that it bears the name of the "fire ant." When once a house is infested with them, there is nothing to be done but to support all boxes, tables, &c. on blocks of wood or stone placed in dishes of water, as even the perspiration on clothes is sufficiently attractive to them; and woe to the poor fellow who puts on garments in which a dozen of these are lodged! It required the most watchful care to keep my collections from the attacks of this insect, as they would devour all the soft parts about the beaks and eyes of bird-skins, and were so particularly fond of fresh Lepidoptera that I have often lost the results of a day's good work by leaving my collecting-box unprotected for half an hour after my return home. *S. pungens* and several other species also frequent houses, and are very destructive, so that in the islands from Celebes eastwards it is hardly possible to preserve collections of natural history without being incessantly on the alert and taking especial precautions against the attack of these ants. *S. laboriosa*, found in Batchian, presents an almost complete series of workers, nine in number, taken from one nest, the largest of which have immense heads and large abdomens, and are four times the length, and probably at least a hundred times the bulk and weight, of the smallest.

The last family of ants, the CRYPTOCERIDÆ, are represented in the Eastern archipelago by the three genera *Meranoplus*, *Cataulacus* and *Cephaloxys*. They are scarce both in individuals and species, and are generally found on foliage or timber, solitary and often motionless.

On the remaining families of Hymenoptera I have few observations. The MUTILLIDÆ were rather abundant, the apterous females running about the ground in sandy places or pathways in the hottest sunshine; the males fly actively about shrubs and foliage, and were often seen carrying off the females. The sexes often differ extraordinarily both in size and coloration; and I

In the Tables of the geographical distribution of the species and genera I have arranged the localities in a certain order, and divided them into groups and regions which I believe to be natural. This arrangement is founded chiefly upon the facts presented by the Mammalia and Birds, groups which are in many respects the best adapted to exhibit clearly the phenomena of geographical distribution, since they are not subject to many disturbing influences which powerfully affect the distribution of insects. These come chiefly under two heads—accidental or involuntary transmission, and direct dependence on vegetation and climate. It is evident that Mammalia have scarcely any means of voluntarily passing from island to island over straits of the sea from twenty to fifty miles wide, or even for a much less distance; and they are scarcely likely to be accidentally carried to sea in large numbers, so as to give a chance of a few swimming over to adjacent islands and there establishing themselves. Accordingly we find that the mammalia inhabiting islands, even when very close to another island or continent, indicate very accurately either the recent separation of the two, in which case (as in Great

species of adjacent islands, we find similar results. For example, of 109 ants found in Borneo and the Malay peninsula, only 12 are common to both, or 11 per cent.; while of the rest of the Hymenoptera, 198 in number, 33 are common, or near 17 per cent. This fact is important, because we learn from it that *genera* and *species* are distributed in the same manner, the want of the power of flight leading to a more restricted range of both. In the case of *species* this is very intelligible, on the simple principle that the present distribution of animals is the result of natural causes; but when we find the same law hold for *genera*, it altogether ceases to be intelligible, unless we suppose species to undergo modification, so that the *individuals* of a *species* become in time the *species* of a *genus*, in which case their distribution will of course be regulated in a similar manner. The fact therefore that the power of flight affects the distribution of *genera* in the same manner as *species*, is a direct argument in favour of the formation of the one from the other by a natural process of modification.

In order to ascertain if the Hymenoptera show plainly the division of the archipelago into two great regions, I will compare the species of Borneo with those of the Malay peninsula on the one hand, and with those of Celebes on the other. On looking at the map, it will be at once seen that the facilities for passing from Borneo to Celebes are much greater than from Borneo to Malacca: yet, in the former case, out of a total of 479 Hymenoptera collected by me in the two islands, only 27 were found in both, equal to less than *six per cent*; in the latter case, out of a total of 307 species 45 were common to both, or about *fifteen per cent.*,—plainly indicating that some other cause than the present proximity and facilities for migration has determined the existing distribution, the cause being, as I believe, that Borneo has been recently connected with Malacca, but has never been united to Celebes. The distinctness of the Hymenoptera of the two regions of the archipelago, however, is much greater than is shown by the mere statement of the number of species and genera peculiar to each, since there are many other genera which have a maximum in one region and give a character to its entomology, while, because a few straggling species have passed into the other region, they do not appear as peculiar groups in either. Thus *Crematogaster*, *Atta*, *Cataulacus*, *Elis*, *Ammophila*, *Ampulex*, *Tachytes*, *Halictus*, and *Ceratina* are characteristic of the Indian region,

though not confined to it; and,
Nomia, and *Crocisa* have a great
region.

The great inequality of our l
prevents me from going into m
distribution. It must not be
given as the total of the Hyme
or 290 from another, that either of these numbers gives any approximation to the sum total of the species inhabiting that island. They merely show what one collector was able to do in each under very different circumstances; and they indicate the points at which future collectors may work with most advantage. The comparatively small number of species yet known from the countries which I have grouped under the term Chinese Asia, from Birmah to China inclusive, and the still more scanty list from the Philippines, show how much there is yet to be done in those countries, even to bring them up to the standard of our still very imperfect knowledge of the Malay archipelago. I would also point out Sumatra, Java, and Timor as islands that would yet well repay an assiduous and persevering entomologist, and which can be visited with much less privation and risk than would be encountered in penetrating to New Guinea and the unknown islands east of it. I would observe, however, that though the individual islands are very unequally known, yet the total number of species obtained from the chief groups of islands, viz. Indo-Malay islands 417, Celebes group 295, Moluccan group 280, Papuan islands 296, indicate a tolerably equal amount of research over the various portions of the archipelago, and render the few results I have deduced from them worthy of some confidence.

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2. *Catalogue*. By F. Smith.

Tribe I. **Heterogyna**, Latr.

Fam. FORMICIDÆ, Leach.

Gen. Formica, *Linn.*

1. Formica crinita, *Smith, Cat. Hym. Ins.* vi. 13. 42, ♀.
Lasius crinitus, *Mayr, Myrm. Stud., Verh. der k. k. zool.-bot. Gesells. in Wien*, 1862, p. 700. 1.
Hab. Northern India.

2. F. TAPROBANÆ, *Smith, Cat. Hym. Ins.* vi. 13. 43, ♀.
Hab. Ceylon.

3. FORMICA COMPRESSA, *Fabr. Syst. Piez.* p. 396. 2; *Hardw. Zool. Journ.* iv. 114; *St.-Farg. Hym.* i. 214. 17; *Smith, Journ. Proc. Linn. Soc.* ii. 53. 2.
Hab. India; China; Philippines; Borneo; Java; Sumatra; Africa.

4. F. GIGAS, *Latr. Hist. Nat. Fourm.* p. 105, pl. 2. f. 2, ☿; *Smith, Proc. Linn. Soc.* ii. 53. 1.
Camponotus gigas, *Mayr, Myrm. Stud.* 669. 29.
Hab. India; Malacca; Borneo; Singapore; Sumatra; Java; China.

5. F. ASSIMILIS, *Jerdon, Madr. Journ.* (1851), p. 123; *Ann. & Mag. Nat. Hist.* 2nd ser. xiii. 107. 42.
Hab. India.

6. F. CYLINDRICA, *Fabr. Syst. Piez.* p. 404. 36; *Latr. Hist. Nat. Fourm.* p. 121, pl. 4. fig. 19.
Colobopsis cylindrica, *Mayr, Myrm. Stud.* p. 691.
Hab. India; Mauritius.

7. F. ABDOMINALIS, *Latr. Hist. Nat. Fourm.* p. 175, pl. 3. fig. 13.
Hab. India.

8. F. ELONGATA, *Fabr. Syst. Piez.* p. 401. 20.
Hab. Tranquebar.

9. F. CONICA, *Fabr. Ent. Syst. Supp.* 279. 24.
Lasius conicus, *Fabr. Syst. Piez.* p. 418. 10.
Hab. Tranquebar.

10. F. NANA, *Jerdon, Madr. Journ.* (1851), 125; *Ann. & Mag. Nat. Hist.* 2nd ser. xiii. 108. 44.
Hab. Tranquebar; Mysore.

11. F. RUFO-GLAUCA, *Jerdon, Madr. Journ.* (1851), 125; *Ann. & Mag. Nat. Hist.* 2nd ser. xiii. 107. 4.
Hab. India.

12. F. PHYLLOPHILA, *Jerdon, Madr. Journ.* (1851), p. 125; *Ann. & Mag. Nat. Hist.* 2nd ser. xiii. 107. 43.
Hab. India.

13. F. CARBONARIA, *Latr. Hist. Nat. Fourm.* 114, pl. 3. fig. 8, ☿.
Hab. India.

14. F. STRICTA, *Jerdon, Madr. Journ.* (1851), 123, ☿; *Ann. & Mag. Nat. Hist.* 2nd ser. xiii. 105. 37; *Smith, Cat. Hym. Ins.* vi. 16. 57.
Colobopsis striatus, *Mayr, Myrm. Stud.* p. 691.
Hab. India; Borneo; Malabar.

15. F. VAGANS, *Jerdon, Madr. Journ.* (1851), 124, ♀, ☿; *Ann. & Mag. Nat. Hist.* 2nd ser. 107. 41.
Hab. India (the Carnatic).

19. F. CALLIDA, *Smith, Cat. Hym. Ins.* vi. 18. 64, ☿.
Hab. India (Deccan).

20. F. LUTEA, *Smith, Cat. Hym. Ins.* vi. 19. 65, ♀.
Hab. Northern India.

21. F. GIBBOSA, *Smith, Cat. Hym. Ins.* vi. p. 2, fig. 2.
Hab. India.

22. F. LONGIPES, *Jerdon, Madr. Journ.* (1851), 122; *Ann. Nat. Hist.* 2nd ser. xiii. 105. 35.
Hab. India; Malacca.

23. F. VARIEGATA, *Smith, Cat. Hym. Ins.* vi. 19. 68.
Camponotus variegatus, *Mayr, Myrm. Stud., Verhand. d. k. botan. Gesells. in Wien*, 1862, p. 656. 4.
Hab. Ceylon; Singapore; Syria.

24. F. MITIS, *Smith, Cat. Hym. Ins.* vi. 20. 69, ☿.
Hab. Ceylon.

25. F. VENTRALIS, *Smith, Cat. Hym. Ins.* iv. 20. 70, ♀.
Hab. Ceylon.

26. F. BACCHUS, *Smith, Cat. Hym. Ins.* vi. 21. 71, ☿.
Hab. Ceylon.

27. F. OBLONGA, *Smith, Cat. Hym. Ins.* vi. 21. 72. ♀.
Hab. Burmah.

28. F. TINCTA, *Smith, Cat. Hym. Ins.* vi. 21. 73, ♀.
Camponotus tinctus, *Mayr, Myrm. Stud.* 676.

32. FORMICA GRACILIPES, *Smith, Cat. Hym. Ins.* vi. 22. 77; *Proc. Linn. Soc.* ii. 55. 13.
Hab. Singapore; Celebes; Aru.

33. F. ARROGANS, *Smith, Cat. Hym. Ins.* vi. 23. 78, ☿.
Hab. Singapore.

34. F. CAMELINA, *Smith, Cat. Hym. Ins.* vi. 23. 79, ☿; *Proc. Linn. Soc.* vi. 57. 18.
Hab. Singapore; Sumatra.

35. F. FESTINA, *Smith, Cat. Hym. Ins.* vi. 23. 80, ♀.
Hab. Borneo; Java; China; Sumatra.

36. F. MISTURA, *Smith, Cat. Hym. Ins.* vi. 24. 81, ♀; *Proc. Linn. Soc.* ii. 53. 5.
Hab. Borneo.

37. F. PILOSA, *Smith, Cat. Hym. Ins.* vi. 24. 82, ☿; *Proc. Linn. Soc.* ii. 54. 7.
Colobopsis pilosa, *Mayr, Myrm. Stud.* 691.
Hab. Borneo.

38. F. DISTINGUENDA, *Smith.*
F. ruficeps, *Smith, Cat. Hym. Ins.* vi. 24. 83, ♀; *Proc. Linn. Soc.* ii. 548 (nec *Fabr.*).
Hab. Borneo.

39. F. FERVENS, *Smith, Cat. Hym. Ins.* vi. 24. 84, ☿; *Proc. Linn. Soc.* ii. 55. 12.
Hab. Borneo.

40. F. IRRITABILIS, *Smith, Cat. Hym. Ins.* vi. 25. 85, ☿; *Proc. Linn. Soc.* ii. 56. 14.
Hab. Borneo; Malacca.

41. F. SEDULA, *Smith, Cat. Hym. Ins.* vi. 25. 86, ☿; *Proc. Linn. Soc.* ii. 65. 15.
Hab. Borneo.

42. F. EXASPERATA, *Smith, Cat. Hym. Ins.* vi. 25. 87, ☿; *Proc. Linn. Soc.* ii. 54. 16.
Camponotus exasperatus, *Mayr, Myrm. Stud.* 659.
Hab. Borneo.

43. F. TENUIPES, *Smith, Cat. Hym. Ins.* vi. 26. 88, ♀; *Proc. Linn. Soc.* ii. 57. 17.
Hab. Borneo.

44. F. PALLIDA, *Smith, Cat. Hym. Ins.* vi. 26. 89, ☿; *Proc. Linn. Soc.* ii. 57. 19.
Camponotus pallidus, *Mayr, Myrm. Stud.* 656. 3.
Hab. Borneo.

45. FORMICA VIGILANS, *Smi*
Hab. Borneo.

46. F. TRIFASCIATA, *Smith*, (
Hab. Java.

47. F. SINGULARIS, *Smith, Cat. Hym. Ins.* vi. 27. 90, ♀.
Hab. Java.

48. F. PLACIDA, *Smith, Cat. Hym. Ins.* vi. 27. 91, ♀.
Hab. Java.

49. F. LUCTUOSA, *Smith, Cat. Hym. Ins.* vi. 27. 94, ♀.
Hab. Sumatra.

50. F. QUADRISECTA, *Smith, Cat. Hym. Ins.* vi. 28. 96, ♀.
Hab. Philippine Islands.

51. F. (CAMPONOTUS) REDTENBACHERI, *Mayr, Myrm. Stud.* 19. 25, ☿.
Hab. Ceylon.

52. F. (CAMPONOTUS) PRISMATICA, *Mayr, Myrm. Stud.* 21. 30, ☿.
Hab. India; Borneo.

53. F. (CAMPONOTUS) SENILIS, *Mayr, Myrm. Stud.* 675. 38, ☿.
Hab. Borneo.

54. F. (CAMPONOTUS) SERICEA, *Mayr, Myrm. Stud.* 675. 39, ☿.
Hab. Mauritius; India; Ceylon; Egypt.

55. F. (CAMPONOTUS) AUROSA, *Roger, Berl. Ent. Zeitschr.* (1863), p. 134. 2, ☿.
Hab. Mauritius.

56. F. (CAMPONOTUS) QUADRILATERA, *Roger, Berl. Ent. Zeitschr.* (1863), p. 136. 6, ☿.
Hab. Coromandel; Pondichery.

57. F. (CAMPONOTUS) SESQUIPEDALIS, *Roger, Berl. Ent. Zeitschr.* (1863), p. 137. 7, ☿.
Hab. Ceylon.

58. F. (CAMPONOTUS) AGNATA, *Roger, Berl. Ent. Zeitschr.* (1863), p. 137. 8, ☿.
Hab. Ceylon.

59. F. (CAMPONOTUS) BARBATA, *Roger, Berl. Ent. Zeitschr.* (1863), p. 138. 9, ☿.
Hab. Ceylon.

60. F. (CAMPONOTUS) VARIANS, *Roger, Berl. Ent. Zeitschr.* (1863), p. 138. 10, ☿.
Hab. Ceylon.

61. FORMICA (CAMPONOTUS) RETICULATA, *Roger, Berl. Ent. Zeitschr.* (1863), p. 139. 11, ☿.
Hab. Ceylon.

62. F. (CAMPONOTUS) PLATYPUS, *Rogers, Berl. Ent. Zeitschr.* (1863), p. 140. 12, ♀.
Hab. Philippine Islands.

63. F. (COLOBOPSIS) CORALLINA, *Roger, Berl. Ent. Zeitschr.* (1863), p. 159. 39, ☿.
Hab. Philippine Islands.

64. F. ANCEPS, *Roger, Berl. Ent. Zeitschr.* (1863), p. 164. 50, ☿.
Hab. Malacca.

65. F. FRAGILIS, *Smith, Proc. Linn. Soc.* iii. 136. 3, ☿.
Hab. Aru; Waigiou.

66. F. FLAVITARSUS, *Smith, Proc. Linn. Soc.* iii. 136. 4, ☿.
Hab. Aru.

67. F. COXALIS, *Smith. Proc. Linn. Soc.* iii. 136. 5, ☿.
Hab. Aru; Waigiou; Mysol; New Guinea.

68. F. CORDATA, *Smith, Proc. Linn. Soc.* iii. 137. 6, ☿.
Hab. Aru.

69. F. OCULATA, *Smith, Proc. Linn. Soc.* iii. 137. 7, ☿.
Hab. Aru.

70. F. MUTILATA, *Smith, Proc. Linn. Soc.* iii. 137. 8, ☿.
Colobopsis mutilata, *Mayr, Myrm. Stud., Verhand. d. k. k. zool.-botan. Gesells. in Wien.* 1862, p. 691.
Hab. Aru.

71. F. QUADRICEPS, *Smith, Proc. Linn. Soc.* iii. 137. 9, ☿.
Colobopsis quadriceps, *Mayr, Myrm. Stud.* 692. 2.
Hab. Aru; Ceram; New Guinea.

72. F. LÆVISSIMA, *Smith, Proc. Linn. Soc.* iii. 138. 10, ☿.
Hab. Aru; Batchian.

73. F. NITIDA, *Smith, Proc. Linn. Soc.* iii. 138. 11, ☿.
Hab. Aru; Mysol.

74. F. SCRUTATOR, *Smith, Proc. Linn. Soc.* iii. 138. 12, ☿.
Hab. Aru.

75. F. ANGULATA, *Smith, Proc. Linn. Soc.* iii. 139. 13, ☿.
Hab. Aru.

76. F. FAMILIARIS, *Smith, Proc. Linn. Soc.* v. 68. 4, ♀.
Hab. Celebes; Aru.

77. F. SUBTILIS, *Smith, Proc. Linn. Soc.* v. 94. 3, ☿.
Hab. Bachian; Aru.

78. FORMICA VITREA, *Smith*,
Hab. Bachian.

79. F. CRUDA, *Smith, Proc. Li*
Hab. Bachian.

80. F. LACTARIA, *Smith, Proc. Linn. Soc.* v. 95. 6, ☿.
Hab. Bachian; Gilolo.

81. F. INCURSOR, *Smith, Proc. Linn. Soc.* v. 95. 7, ☿.
Hab. Bachian.

82. F. RUFIFRONS, *Smith, Proc. Linn. Soc.* v. 95. 8.
Colobopsis rufifrons, *Mayr, Myrm. Stud.* 691.
Hab. Bachian.

83. F. PAVIDA, *Smith, Proc. Linn. Soc.* v. 96. 9, ♀.
Hab. Bachian; Mysol.

84. F. DOMESTICA.
Formica familiaris, *Smith, Proc. Linn. Soc.* v. 96. 10.
Hab. Bachian.

85. F. DORYCUS, *Smith, Proc. Linn. Soc.* v. 96. 11, ☿.
Hab. New Guinea.

86. F. DESECTA, *Smith, Proc. Linn. Soc.* v. 97. 12, ♀.
Hab. New Guinea.

87. F. CONSANGUINEA, *Smith, Proc. Linn. Soc.* vi. 36. 3, ☿.
Hab. Celebes.

88. F. CIRCUMSPECTA, *Smith, Proc. Linn. Soc.* vi. 37. 4, ♀, ☿.
Hab. Celebes; Waigiou.

89. F. LEUCOPHÆA, *Smith, Proc. Linn. Soc.* vi. 7. 35, ☿.
Hab. Celebes.

90. F. TROPICA, *Smith, Proc. Linn. Soc.* vi. 7. 36, ☿.
Hab. Gilolo.

91. F. VIRULENA, *Smith, Proc. Linn. Soc.* vi. 38. 7, ☿.
Hab. Celebes.

92. F. LONGICEPS, *Smith, Proc. Linn. Soc.* vii. 13. 9, ☿.
Hab. Waigiou.

93. F. AFFINIS, *Le Guillou, Ann. Soc. Ent. Fr.* (1841), 314. 8, ♀.
Hab. Borneo.

94. F. ARCUATA, *Le Guillou, Ann. Soc. Ent. Fr.* (1841), 315. 10, ♂.
Hab. Borneo.

95. F. RUGINOSA, *Le Guillou, Ann. Soc. Ent. Fr* (1841), 316. 11, ☿.
Hab. Borneo.

96. FORMICA PYRRHOCEPHALA, *Motsch. Bull. Soc. Imp. des Nat. Mosc.* (1863), 11, ☿.
Hab. Ceylon.

97. F. FUSCICAUDA, *Motsch. Bull. Soc. Imp. des Nat. Mosc.* 12, ☿.
Hab. Ceylon.

98. F. SUBPICEA, *Motsch. Bull. Soc. Imp. des Nat. Mosc.* 12.
Hab. Ceylon.

99. F. LATEBROSA, *Walk. Ann. & Mag. Nat. Hist.* (1859), iv. 371, ♂.
Hab. Ceylon.

100. F. PUNGENS, *Walk. Ann. & Mag Nat. Hist.* (1859), iv. 371, ♂.
Hab. Ceylon.

101. F. INGRUENS, *Walk. Ann. & Mag. Nat. Hist.* (1859), iv. 372, ♀.
Hab. Ceylon.

102. F. DIFFIDENS, *Walk. Ann. & Mag. Nat. Hist.* (1859), iv. 372, ♀.
Hab. Ceylon.

103. F. OBSCURANS, *Walk. Ann. & Mag. Nat. Hist.* (1859), iv. 372, ☿.
Hab. Ceylon.

104. F. INDEFLEXA, *Walk. Ann. & Mag. Nat. Hist.* (1859), iv. 373, ☿.
Hab. Ceylon.

105. F. CONSULTANS, *Walk. Ann. & Mag. Nat. Hist.* (1859), iv. 373, ♂.
Hab. Ceylon.

Gen. PARATRECHINA, *Motsch.*

1. PARATRECHINA VAGABUNDA, *Motsch. Bull. Soc. Imp. des Nat. Mosc.* (1863), 13, ☿.
Hab. Ceylon (the mountains of Patannas).

Gen. TAPINOMA, *Foerst.*

1. TAPINOMA GLABRATA, *Smith, Proc. Linn. Soc.* ii. 58. 1, ☿.
Hab. Malacca.

2. T. THORACICA, *Smith, Proc. Linn. Soc.* v. 69. 1, ☿.
Hab. Celebes.

3. T. NITIDA, *Smith, Proc. Linn. Soc.* v. 69. 2, ☿.
Hab. Celebes.

4. T. PRATENSIS, *Smith, Proc. Linn. Soc.* v. 97. 1, ☿.
Hab. Bachian.

5. T. GIBBA, *Smith, Proc. Linn. Soc.* vi. 38. 8, ☿.
Hab. Celebes.

6. TAPINOMA ALBIPES, *Smith, Proc. Linn. Soc.* vi. 38. 9, ☿.
Hab. Celebes.

7. T. ALBITARSE, *Motsch. Bull. Imp. des Nat. Mosc.* 14, ☿.
Hab. Ceylon (Colombo).

Gen. HYPOCLINEA, *Mayr.*

1. HYPOCLINEA BITUBERCULATA, *Mayr, Myrm. Stud.* p. 705. 2, ☿.
Hab. Philippines.

2. H. GRACILIS, *Motsch. Bull. Imp. Soc. des Nat. Mosc.* 14, ☿.
Hab. Ceylon (Colombo).

Gen. POLYRHACHIS, *Smith.*

1. POLYRHACHIS (FORMICA) BIHAMATUS, *Drury, Ins.* ii. pl. 38. fig. 7, ☿; *Fabr. Syst. Piez.* p. 411. 66; *Oliv. Encycl. Meth.* vi. 499; *Latr. Hist. Nat. Fourm.* p. 127; *Smith, Cat. Hym. Ins.* vi. 58. 1; *Proc. Linn. Soc.* ii. 58, 59; *Mayr, Myrm. Stud.* 677. 1.
Hab. India; Sumatra; Borneo; Waigiou; Bachian; Celebes; Ceram.

2. P. HASTATUS, *Latr. Hist. Nat. Fourm.* p. 129, pl. iv. fig. 23, ☿; *St.-Farg. Hym.* i. 221. 29; *Jerdon, Ann. & Mag. Nat. Hist.* 2nd ser. xiii. 109.
Hab. India.

3. P. SEXSPINOSUS, *Latr. Hist. Nat. Fourm.* p. 126. pl. iv. fig. 21, ☿; *St.-Farg. Hym.* i. 219. 26; *Le Guillou, Ann. Soc. Ent. Fr.* (1841). 313. 4; *Guér. Voy. Coq. Zool.* ii. 204. pl. 8. fig. 3; *Jerdon, Ann. & Mag. Nat. Hist.* 2nd. ser. xiii. 109; *Smith, Cat. Hym. Ins.* vi. 59. 3; *Proc. Linn. Soc.* iv. 139. 2.
Hab. India; Philippine Islands; Triton Bay.

4. P. (FORMICA) RELUCENS, *Latr. Hist. Nat. Fourm.* p. 131; *St.-Farg. Hym.* i. 220. 27; *Jerdon, Ann. & Mag. Nat. Hist.* 2nd ser. xiii. 109. *Smith, Proc. Linn. Soc.* ii. 59. 2; *Mayr, Myrm. Stud.* 685. 17.
Hab. India; Borneo; Ceylon; Java.

5. P. RASTELLATUS, *Latr. Hist. Nat. Fourm.* p. 130. ☿.
Hab. India.

6. P. NIDIFICANS, *Jerdon, Ann. & Mag. Nat. Hist.* 2nd ser. xiii. 108. 45.
Hab. India (Malabar).

7. P. SYLVICOLA, *Jerdon, Ann. & Mag. Nat. Hist.* 2nd ser. xiii. 108. 46
Hab. India.

8. P. LACTEIPENNIS, *Smith, Cat. Hym. Ins.* vi. 34. 115, ☿.
Hab. Northern India.

9. POLYRHACHIS PILIVENTRIS, *Smith, Cat. Hym. Ins.* vi. 60. 9, ♀.
Hab. Singapore.

10. P. DIVES, *Smith, Cat. Hym. Ins.* vi. 60. 10, ☿; *Proc. Linn. Soc.* ii. 64. 19.
Hab. Singapore; Malacca; Waigiou; Ceram; Bachian.

11. P. FLAVICORNIS, *Smith, Cat. Hym. Ins.* vi. 60. 11, ♀; *Proc. Linn. Soc.* ii. 63. 17.
Hab. Singapore; Malacca; Borneo.

12. P. HECTOR, *Smith, Proc. Linn. Soc.* ii. 62. 14, ☿; *Cat. Hym. Ins.* vi. 61. 12.
Hab. Singapore.

13. P. MODESTUS, *Smith, Proc. Linn. Soc.* ii. 62. 12; *Cat. Hym. Ins.* vi. 61. 13, ♀.
Hab. Singapore.

14. P. CHALYBEUS, *Smith, Proc. Linn. Soc.* ii. 61. 9; *Cat. Hym. Ins.* xii. 61. 14, ☿.
Hab. Singapore; Malacca.

15. P. PANDARUS, *Smith, Proc. Linn. Soc.* ii. 62. 13; *Cat. Hym. Ins.* vi. 65. 27, ☿.
P. defensus, *Smith, Proc. Linn. Soc.* ii. 59. 4; *Cat. Hym. Ins.* vi. 62. 15.
Hab. Singapore; Java; Philippines; Borneo.

16. P. LÆVIGATUS, *Smith, Proc. Linn. Soc.* ii. 62. 15; *Cat. Hym. Ins.* vi. 62. 16, ☿.
Hab. Malacca; Borneo.

17. P. TEXTOR, *Smith, Proc. Linn. Soc.* ii. 60. 8; *Cat. Hym. Ins.* vi. 62. 17, pl. i. fig. 1, ☿.
Hab. Malacca.

18. P. CARBONARIUS, *Smith, Proc. Linn. Soc.* ii. 60. 7; *Cat. Hym. Ins.* vi. 62. 18, ☿.
Hab. Malacca.

19. P. AFFINIS, *Smith, Cat. Hym. Ins.* vi. 63. 19, ☿.
Hab. Burmah.

20. P. ABDOMINALIS, *Smith, Cat. Hym. Ins.* vi. 63. 20, ☿.
Hab. Burmah.

21. P. TIBIALIS, *Smith, Cat. Hym. Ins.* vi. 63. 21, ☿.
Hab. Burmah.

22. P. MUTATUS, *Smith, Cat. Hym. Ins.* vi. 64. 22, ☿, pl. iv. figs. 12, 13.
Hab. Burmah.

23. POLYRHACHIS LÆVISSIMUS, *Smith, Cat. Hym. Ins.* vi. 64. 23, ☿.
Hab. Burmah.

24. P. FURCATUS, *Smith, Cat. Hym. Ins.* vi. 64. 24, ♀, pl. 4. f. 20.
Hab. Burmah.

25. P. BICOLOR, *Smith, Cat. Hym. Ins.* vi. 65. 25, ♀.
Hab. Burmah.

26. P. SUMATRENSIS, *Smith, Cat. Hym. Ins.* vi. 65. 26, pl. 4. fig. 43.
Hab. Sumatra.

27. P. CUSPIDATUS, *Smith, Cat. Hym. Ins.* vi. 66. 28, ☿; *Proc. Linn. Soc.* ii. 63. 14.
Hab. Borneo.

28. P. EQUINUS, *Smith, Cat. Hym. Ins.* vi. 66. 29, ☿; *Proc. Linn. Soc.* ii. 63. 16.
Hab. Borneo.

29. P. VINDEX, *Smith, Cat. Hym. Ins.* vi. 66. 30, ☿; *Proc. Linn. Soc.* ii. 64. 20.
Hab. Borneo.

30. P. RUFIPES, *Smith, Cat. Hym. Ins.* vi. 66. 31, ☿, pl. 4. fig. 28.
Hab. Borneo.

31. P. CASTANEIVENTRIS, *Smith, Cat. Hym. Ins.* vi. 67. 32, ♀.
Hab. Borneo.

32. P. VILLIPES, *Smith, Cat. Hym. Ins.* vi. 67. 33, ☿, pl. 4. figs. 37. 38; *Proc. Linn. Soc.* ii. 61. 11.
Hab. Borneo.

33. P. NITIDUS, *Smith, Cat. Hym. Ins.* vi. 67. 34; *Proc. Linn. Soc.* ii. 61. 10.
Hab. Borneo.

34. P. RUFICORNIS, *Smith, Cat. Hym. Ins.* vi. 68. 35, ♀; *Journ. Proc. Linn. Soc.* ii. 60. 6.
Hab. Borneo.

35. P. CONSTRUCTOR, *Smith, Cat. Hym. Ins.* vi. 68. 36, ♀; *Proc. Linn. Soc.* ii. 60. 5.
Hab. Borneo.

36. P. INERMIS, *Smith, Cat. Hym. Ins.* vi. 68. 37, ☿, pl. 4. f. 25, 26.
Hab. Celebes.

37. P. RIXOSUS, *Smith, Cat. Hym. Ins.* vi. 68. 38, ☿, pl. 4. fig. 27.
Hab. Celebes.

38. P. PHILIPPINENSIS, *Smith, Cat. Hym. Ins.* vi. 69. 41, ☿.
Hab. Philippines.

39. POLYRHACHIS MALIGNUS, *Smith, Cat. Hym. Ins.* vi. 70. 42, pl. 4. fig. 44.
Hab. Philippines.

40. P. CYANIVENTRIS, *Smith, Cat. Hym. Ins.* vi. 70. 43, ♀, pl. 4. fig. 47.
Hab. Philippines.

41. P. ACICULATUS, *Smith, Cat. Hym. Ins.* vi. 70. 44, ☿, pl. 4. figs. 17, 18.
Hab. Philippines.

42. P. CARINATUS, *Fabr. Syst. Piez.* p. 413. 71; *St.-Farg.* i. 220. 28; *Jerdon, Madr. Journ.* 1851, 126; *Ann. & Mag. Nat. Hist.* 2nd ser. xiii. 109.
Hab. Malacca; Singapore.

43. P. SERICATUS, *Guér. Voy. Coq.* ii. 203, Atlas, pl. 8. figs. 2, 2 *a, b, c, d*; *Smith, Append. Cat. Hym. Ins.* vi. 200; *Proc. Linn. Soc.* iii. 139. 1.
Hab. Bachian; Martabello; Bouru; Key; Aru; New Hebrides.

44. P. MARGINATUS, *Smith, Proc. Linn. Soc.* iii. 139. 3, ☿.
Hab. Aru; India; Philippines; Waigiou; Bachian.

45. P. HOSTILIS, *Smith, Proc. Linn. Soc.* iii. 139. 4, ☿.
Hab. Aru.

46. P. LONGIPES, *Smith, Proc. Linn. Soc.* iii. 140. 5, ☿.
Hab. Aru.

47. P. SERRATUS, *Smith, Proc. Linn. Soc.* iii. 140. 6, ☿.
Hab. Aru; Waigiou.

48. P. SCUTULATUS, *Smith, Proc. Linn. Soc.* iii. 140. 7, ☿.
Hab. Aru; Ceram.

49. P. MUCRONATUS, *Smith, Proc. Linn. Soc.* iii. 140. 8, ☿.
Hab. Aru.

50. P. GEOMETRICUS, *Smith, Proc. Linn. Soc.* iii. 141. 9, ☿.
Hab. Aru.

51. P. IRRITABILIS, *Smith, Proc. Linn. Soc.* iii. 141. 10, ☿ (sexspinosus ♀?).
Hab. Aru.

52. P. LÆVISSIMUS, *Smith, Proc. Linn. Soc.* iii. 141. 11, ☿.
Hab. Aru.

53. P. BELLICOSUS, *Smith, Proc. Linn. Soc.* iii. 142. 12, ☿.
Hab. Aru.

54. P. HECTOR, *Smith, Proc. Linn. Soc.* iii. 142. 13, ☿.
Hab. Aru.

55. POLYRHACHIS RUFOFEMORATUS, *Smith, Proc. Linn. Soc.* iii. 142. 14, ☿.
Hab. Aru; Ternate; Ceram.

56. P. PHYLLOPHILUS, *Smith, Proc. Linn. Soc.* v. 69. 1, ☿.
Hab. Celebes.

57. P. COMPRESSICORNIS, *Smith, Proc. Linn. Soc.* v. 69. 2, ♀.
Hab. Celebes.

58. P. RUGIFRONS, *Smith, Proc. Linn. Soc.* v. 70. 3, ♀.
Hab. Celebes; Mysol.

59. P. SCULPTURATUS, *Smith, Proc. Linn. Soc.* v. 70. 4, ♀ ☿.
Hab. Celebes; Timor.

60. P. NUDATUS, *Smith, Proc. Linn. Soc.* v. 71. 5, ☿.
Hab. Celebes.

61. P. PEREGRINUS, *Smith, Proc. Linn. Soc.* v. 71. 6, ♀.
Hab. Celebes.

62. P. VESTITUS, *Smith, Proc. Linn. Soc.* v. 71. 7, ☿.
Hab. Celebes.

63. P. SÆVISSIMUS, *Smith, Proc. Linn. Soc.* v. 71. 8, ☿.
Hab. Celebes.

64. P. ORSYLLUS, *Smith, Proc. Linn. Soc.* vi. 39. 8, ☿, pl. 1. fig. 6
Hab. Celebes; Ceram.

65. P. MUTILUS, *Smith, Proc. Linn. Soc.* vi. 39. 9, ☿, pl. 1. fig. 7
Hab. Celebes.

66. P. OLENUS, *Smith, Proc. Linn. Soc.* vi. 39. 10, ☿, pl. 1. fig. 8.
Hab. Celebes.

67. P. DEMOCLES, *Smith, Proc. Linn. Soc.* vi. 40. 11, ☿, pl. 1 fig. 9.
Hab. Celebes.

68. P. VALERUS, *Smith, Proc. Linn. Soc.* vi. 40. 12, ☿, pl. 1. fig. 10.
Hab. Celebes.

69. P. TRISPINOSUS, *Smith, Proc. Linn. Soc.* vi. 40. 13, ♀, pl. 1 fig. 11.
Hab. Celebes.

70. P. DIAPHANTUS, *Smith, Proc. Linn. Soc.* vi. 40. 14, ☿, pl. 1. fig. 12.
Hab. Celebes; Ceram.

71. P. AMANUS, *Smith, Proc. Linn. Soc.* vi. 41. 15, ☿, pl. 1. fig. 13.
Hab. Celebes

72. POLYRHACHIS CLEOPHANES, *Smith, Proc. Linn. Soc.* vi. 41. 16, ☿, pl. 1. fig. 14.
Hab. Celebes.

73. P. EXASPERATUS, *Smith, Proc. Linn. Soc.* vi. 41. 17, ☿, pl. 1. figs. 15, 16.
Hab. Celebes.

74. P. VIRIDIA, *Smith, Proc. Linn. Soc.* vi. 42. 18, ♀, pl. 1. fig. 17.
Hab. Celebes.

75. P. NUMERIA, *Smith, Proc. Linn. Soc.* vi. 42. 20, ☿, pl. 1. fig. 19.
Hab. Celebes.

76. P. HIPPOMANES, *Smith, Proc. Linn. Soc.* vi. 43. 21, ☿, pl. 1. fig. 20.
Hab. Celebes.

77. P. LYCIDAS *Smith, Proc. Linn. Soc.* vi. 43. 22, ☿, pl. 1. fig. 21.
Hab. Celebes.

78. P. ZOPYRUS, *Smith, Proc. Linn. Soc.* vi. 43. 23, ☿, pl. 1. fig. 22.
Hab. Celebes.

79. P. EURYTUS, *Smith, Proc. Linn. Soc.* vi. 43. 24, ♀, pl. 1. fig. 23.
Hab. Celebes.

80. P. CHAONIA, *Smith, Proc. Linn. Soc.* vi. 42. 19, ♀, pl. 1. fig. 18.
Hab. Gilolo.

81. P. CHARAXUS, *Smith, Proc. Linn. Soc.* v. 98. 6, ☿, pl. 1. fig. 14.
Hab. Bachian.

82. P. BUSIRIS, *Smith, Proc. Linn. Soc.* v. 98. 7, ☿, pl. 1. fig. 15.
Hab. Bachian; Dorey.

83. P. ACANTHA, *Smith, Proc. Linn. Soc.* v. 98. 8, ☿, pl. 1. fig. 16.
Hab. Bachian.

84. P. MEROPS, *Smith, Proc. Linn. Soc.* v. 98. 9, ☿.
Hab. Bachian.

85. P. ITHONUS, *Smith, Proc. Linn. Soc.* v. 99. 10, ☿.
Hab. Bachian.

86. P. EUDORA, *Smith, Proc. Linn. Soc.* v. 99. 11, ♀.
Hab. Bachian.

87. P. METELLA, *Smith, Proc. Linn. Soc.* v. 99. 12, ☿.
Hab. Dory.

88. P. ATROPOS, *Smith, Proc. Linn. Soc.* v. 100. 13, ☿.
Hab. Dory.

89. Polyrhachis Acasta,
Hab. Bachian.

90. P. Alphenus, *Smith, Proc. Linn. Soc.* v. 100. 15, ☿.
Hab. Bachian.

91. P. Labella, *Smith, Proc. Linn. Soc.* v. 100. 16, ☿.
Hab. Bachian.

92. P. fervens, *Smith, Proc. Linn. Soc.* v. 110. 17, ☿.
Hab. Amboyna.

93. P. Dolomedes, *Smith, Proc. Linn. Soc.* vii. 14. 17, ♀, ☿.
Hab. Ceram.

94. P. Trophimus, *Smith, Proc. Linn. Soc.* vii. 14. 18, ☿.
Hab. Ceram.

95. P. Alpheus, *Smith, Proc. Linn. Soc.* vii. 14. 19, ☿.
Hab. Waigiou.

96. P. Bubastes, *Smith, Proc. Linn. Soc.* vii. 15. 20, ♀.
Hab. Waigiou.

97. P. paromalus, *Smith, Proc. Linn. Soc.* vii. 15. 21, ☿.
Hab. Ceram.

98. P. Xiphias, *Smith, Proc. Linn. Soc.* vii. 16. 22, ♀.
Hab. Waigiou.

99. P. Euryalus, *Smith, Proc. Linn. Soc.* vii. 16. 23, ☿.
Hab. Mysol.

100. P. Derecynus, *Smith, Proc. Linn. Soc.* vii. 16. 24, ☿.
Hab. Waigiou.

101. P. Sparaxes, *Smith, Proc. Linn. Soc.* vii. 16. 25, ♀.
Hab. Mysol.

102. P. nigriceps, *Smith, Proc. Linn. Soc.* vii. 17. 26, ☿.
Hab. Waigiou.

103. P. paxillus, *Smith, Proc. Linn. Soc.* vii. 17. 27, ☿.
Hab. Martabello.

104. P. Neptunus, *Smith, Proc. Linn. Soc.* viii. 69. 17, ☿.
Hab. New Guinea.

105. P. thrinax, *Roger, Berl. Ent. Zeitschr.* (1863), 152. 29, ☿.
Hab. Ceylon.

106. P. punctillata, *Roger, Berl. Ent. Zeitschr.* (1863), 152. 30, ☿.
Hab. Ceylon.

107. POLYRHACHIS CONVEXA, *Roger, Berl. Ent. Zeitschr.* (1863), 153. 31, ☿.
Hab. Ceylon.

108. P. DECIPIENS, *Roger, Berl. Ent. Zeitschr.* (1863), 156. 35, ☿.
Hab. Bachian.

109. P. RUPICAPRA, *Roger, Berl. Ent. Zeitschr.* (1863), 154. 32, ☿.
Hab. Ceylon.

110. P. PROXIMA, *Roger, Berl. Ent. Zeitschr.* (1863), 155. 33, ☿.
Hab. Island of Lingga.

111. P. LATIFRONS, *Roger, Berl. Ent. Zeitschr.* (1863), 155. 34, ☿.
Hab. Island of Bintang.

112. P. PRESSUS, *Mayr, Myrm. Stud.* p. 33. 8, ☿.
Hab. Java.

113. P. ARGENTEUS, *Mayr, Myrm. Stud.* p. 34. 9, ☿.
Hab. Philippines.

114. P. CLYPEATUS, *Mayr, Myrm. Stud.* p. 35. 12, ♀.
Hab. Ceylon.

115. P. NIGER, *Mayr, Myrm. Stud.* p. 35. 13, ♀.
Hab. Ceylon.

116. P. AURICHALCEUS, *Mayr, Myrm. Stud.* p. 36. 14, ♀.
Hab. Java.

117. P. CYANEUS, *Mayr, Myrm. Stud.* p. 36. 16, ♀. (P. cyaniventris, *Cat. Form.* p. 70, var.?)
Hab. Java.

118. P. STRIATUS, *Mayr, Myrm. Stud.* p. 38. 19, ♀.
Hab. Java.

119. P. STRIATORUGOSUS, *Mayr, Myrm. Stud.* p. 38. 20, ☿.
Hab. Birmah, Java.

120. P. FRAUENFELDI, *Mayr, Myrm. Stud.* p. 39. 22, ☿.
Hab. Java.

121. P. (FORMICA) RASTELLATUS, *Latr. Fourm.* p. 130, ♀; *Mayr, Myrm. Stud.* p. 40. 23, ♀.
Hab. India.

122. P. (FORMICA) ARMATUS, *Le Guillou, Ann. Soc. Ent. Fr.* (1841), 313. 5.
Hab. Philippines.

iv. 370, ♀.
Hab. Ceylon.

Gen. Hemioptica, *Roger.*

1. Hemioptica (Polyrhachis?) scissa, *Roger, Berl. Ent. Z* (1862), 240, Taf. 1. fig. 12, ♀, ☿.
Hab. Ceylon.

Gen. Echinopla, *Smith.*

1. Echinopla melanarctos, *Smith, Proc. Linn. Soc.* ii. 7 *Cat. Hym. Ins. Form.* vi. 197. 1.
Hab. Singapore; Borneo; Sumatra.

2. E. pallipes, *Smith, Proc. Linn. Soc.* ii. 80. 2, ☿; *Cat. H Form.* vi. 198. 2; *Mayr, Myrm. Stud.* p. 688. 1.
Hab. Borneo; Celebes.

3. E. striata, *Smith, Proc. Linn. Soc.* ii. 80. 3, ☿; *Cat. Hy Form.* vi. 80. 3, ☿; *Mayr, Myrm. Stud.* p. 689. 2, ☿.
Hab. Malacca; Borneo; Sumatra; Celebes; Ceram.

4. E. prætexta, *Smith, Proc. Linn. Soc.* v. 113. 1, ☿.
Hab. Bachian.

5. E. dubitata, *Smith, Proc. Linn. Soc.* vi. 50. 3, ☿.
Hab. Celebes.

6. E. nitida, *Smith, Proc. Linn. Soc.* vii. 23. 2, ☿.
Hab. Ceram.

7. E. lineata, *Mayr, Myrm. Stud.* 689. 3, ☿.
Hab. Java.

Gen. Acropyga, *Roger*.

1. Acropyga acutiventris, *Roger, Berl. Ent. Zeitschr.* (1862), 243, ♀, ☿.

Hab. Ceylon.

Gen. Œcophylla, *Smith*.

1. Œcophylla (Formica) smaragdina, *Fabr. Syst. Piez.* p. 397. 4; *Latr. Fourm.* p. 176, pl. 3. fig. 18; *St.-Farg. Hym.* i. 218. 25; *Jerdon, Mad. Journ.* (1851), 121; *Ann. & Mag. Nat. Hist.* (1854), xiii. 104; *Smith, Proc. Linn. Soc.* v. 102.

Hab. India; China; Philippines; Malacca; Borneo; Gilolo; Java; Bachian; Waigiou; Dorey; Mysol; Celebes; Aru; Timor.

Fam. ODONTOMACHIDÆ, Mayr.

Gen. Odontomachus, *Latr*.

1. Odontomachus rixosus, *Smith, Cat. Hym. Ins. Form.* vi. 79. 9, ☿; *Proc. Linn. Soc.* ii. 64. 1.

Hab. Singapore; Ternate.

2. O. rugosus, *Smith, Proc. Linn. Soc.* ii. 65. 2.

Hab. Singapore.

3. O. sævissimus, *Smith, Cat. Hym. Ins. Form.* vi. 80. 12, ☿.

Hab. Ceram; Bachian.

4. O. simillimus, *Smith, Cat. Hym. Ins. Form.* vi. 80. 11, ♀.

Hab. Fidjee Islands; Ceylon; Aru; Celebes; China; Waigiou.

5. O. infandus, *Smith, Cat. Hym. Ins. Form.* vi. 81. 13, ☿.

Hab. Philippines.

6. O. Nietneri, *Roger, Berl. Ent. Zeitschr.* (1860), 23. 78, ☿; (O. simillima, *Smith*, ☿?).

Hab. Ceylon.

7. O. tyrannicus, *Smith, Proc. Linn. Soc.* iii. 144. 2, ☿.

Hab. Aru; Waigiou.

8. O. malignus, *Smith, Proc. Linn. Soc.* iii. 144. 3, ☿.

Hab. Aru; Mysol; Ceram.

9. O. animosus, *Smith, Proc. Linn. Soc.* v. 102. 2. ☿

Hab. New Guinea.

10. O. nigriceps, *Smith, Proc. Linn. Soc.* v. 103. 3, ☿.

Hab. New Guinea.

Hab. Mysol.

Gen. Drepanognathus, *Smith*.

1. Drepanognathus (Harpegnathos) saltator, *Jerdon*,
Journ. (1851), 116, and *Ann*. & *Mag*. *Nat*. *Hist*. 2nd ser. x
(1854); *Smith, Cat*. *Hym*. *Ins*. *Form*. vi. 82. 1.
Hab. India.

2. D. venator, *Smith*, *Cat*. *Hym*. *Ins*. *Form*. vi. 82. 3.
Hab. Madras.

Fam. PONERIDÆ, Smith.

Gen. Ponera.

1. Ponera sculpta, *Jerdon*, *Madr*. *Journ*. (1851), 117, and *Ann*.
Nat. *Hist*. (1854), xiii. 101; *Smith*, *Cat*. *Hym*. *Ins*. *Form*. vi
Hab. Malabar.

2. P. stenocheilos, *Jerdon*, *Madr*. *Journ*. (1851), 118; *Ann*. &
Nat. *Hist*. (1854), xiii. 101.
Hab. Malabar.

3. P. processionalis, *Jerdon*, *Madr*. *Journ*. (1851), 118;
Mag. *Nat*. *Hist*. (1854), xiii. 102.
Hab. India.

4. P. affinis, *Jerdon*, *Madr*. *Journ*. (1851), 118; *Ann*. & *Mag*
Hist. (1854), xiii. 102.
Hab. Malabar.

5. P. pumila, *Jerdon*, *Madr*. *Journ*. (1851), 119; *Ann*. & *Mag*
Hist. (1854) xiii. 102.
Hab. Malabar.

10. Ponera rubra, *Smith, Cat. Hym. Ins. Form.* vi. 86. 13, ♀; *Journ. Proc. Linn. Soc.* ii. 66. 2.
Hab. Singapore.

11. P. geometrica, *Smith, Cat. Hym. Ins. Form.* vi. 86. 14, ☿; *Proc. Linn. Soc.* ii. 67. 8; *Roger, Berl. Ent. Zeitschr.* (1860), 301. 26.
Diacamma geometricum, *Roger, Berl. Ent. Zeitschr.* (1863), p. 16.
Hab. Singapore; Ceylon; Celebes.

12. P. transversa, *Smith, Cat. Hym. Ins. Form.* vi. 86. 15, ☿; *Proc. Linn. Soc.* ii. 68. 9.
Hab. Singapore.

13. P. pallipes, *Smith, Cat. Hym. Ins. Form,* vi. 87. 16, ♂.
Hab. Java.

14. P. versicolor, *Smith, Cat. Hym. Ins. Form.* vi. 87. 17, ☿; *Proc. Linn. Soc.* ii. 65. 1.
P. sculpta, *Roger, Berl. Ent. Zeitschr.* (1860), p. 300 (nec *Jerdon*).
Hab. Borneo; Philippines.

15. P. (apicalis) terminalis, *Smith, Cat. Hym. Ins. Form.* vi. 88. 18 (nec "apicalis," *Latr. Fourm.* p. 204).
Hab. Borneo.

16. P. iridescens, *Smith, Cat. Hym. Ins. Fourm.* vi. 88. 19, ☿; *Journ. Proc. Proc. Linn. Soc.* ii. 66. 4.
Hab. Borneo.

17. P. (rugosa) coxalis, *Smith, Cat. Hym. Ins. Form.* vi. 88. 20; *Proc. Linn. Soc.* ii. 66. 5. (nec "rugosa," *Le Guillou*).
P. coxalis, *Roger, Berl. Ent. Zeitschr.* (1860), 308. 43.
Hab. Borneo; Celebes; Aru.

18. P. rugosa, *Le Guillou, Ann. Soc. Ent. Fr.* (1841), p. 318. 15, ☿.
Hab. Borneo.

19. P. intricata, *Smith, Cat. Hym. Ins. Form.* vi. 88. 21, ☿; *Proc. Linn. Soc.* ii. 67. 7.
Hab. Borneo.

20. P. vidua, *Smith, Cat. Hym. Ins. Form.* vi. 89. 22, ♂; *Proc. Linn. Soc.* ii. 68. 10.
Hab. Borneo.

21. P. diminuta, *Smith, Cat. Hym. Ins. Form.* vi. 89. 23, ☿; *Proc. Linn. Soc.* ii. 69. 11.
Hab. Borneo.

22. PONERA POMPILOIDES, *Smith, Cat. Hym. Ins. Form.* vi. 90. 24, ♂; *Proc. Linn. Soc.* ii. 69. 12.
Hab. Borneo.

23. P. LÆVICEPS, *Smith, Cat. Hym. Ins. Form.* vi. 90. 25; *Proc. Linn. Soc.* ii. 69. 13.
Hab. Borneo; Waigiou; Bachian; Celebes.

24. P. OCELLIFERA, *Roger, Berl. Ent. Zeitschr.* (1860), p. 13. 68, ☿.
Hab. Ceylon.

25. P. (SYSCIA) TYPHLA, *Roger, Berl. Ent. Zeitschr.* (1860), p. 38. 75, ☿.
Hab. Ceylon.

26. P. (MYOPIAS) AMBLYOPS, *Roger, Berl. Ent. Zeitschr.* (1860), p. 39. 120, ☿.
Hab. Ceylon.

27. P. (LEPTOGENYS) FALCIGERA, *Roger, Berl. Ent. Zeitschr.* (1860), p. 42. 122, ☿.
Hab. Ceylon.

28. P. SCULPTURATA, *Smith, Proc. Linn. Soc.* iii. 142. 2, ☿.
Diacamma sculpturatum, *Roger, Berl. Ent. Zeitschr.* (1863), p. 16.
Hab. Aru.

29. P. PARALLELA, *Smith, Proc. Linn. Soc.* iii. 143. 3, ☿.
Hab. Aru; Celebes.

30. P. QUADRIDENTATA, *Proc. Linn. Soc.* iii. 143. 4, ♀.
Hab. Aru.

31. P. TRUNCATA, *Smith, Proc. Linn. Soc.* v. 72. 3, ♀.
Hab. Celebes.

32. P. UNICOLOR, *Smith, Proc. Linn. Soc.* v. 73. 4, ♂.
Hab. Celebes.

33. P. PALLIDICORNIS, *Smith, Proc. Linn. Soc.* v. 73. 5, ♂.
Hab. Celebes.

34. P. PALLIDIPENNIS, *Smith, Proc. Linn. Soc.* v. 73. 6, ♂.
Hab. Celebes.

35. P. MALIGNA, *Smith, Proc. Linn. Soc.* vi. 44. 4, ☿.
Hab. Celebes.

36. P. NITIDA, *Smith, Proc. Linn. Soc.* vi. 45. 5, ☿.
Hab. Celebes.

37. P. MUTABILIS, *Smith, Proc. Linn. Soc.* vi. 45. 6, ☿.
Hab. Celebes.

38. Ponera purpurea, *Smith, Proc. Linn. Soc.* vii. 18. 4, ☿.
Hab. Gilolo.

39. P. tortuolosa, *Smith, Proc. Linn. Soc.* vii. 18. 5, ☿, ♀.
Hab. Ceram; Bouru.

40. P. ferox, *Smith, Proc. Linn. Soc.* viii. 70. 5, ☿.
Hab. Salwatty.

41. P. solitaria, *Smith, Proc. Linn. Soc.* v. 103. 2, ♂.
Hab. Bachian.

42. P. vagans, *Smith, Proc. Linn. Soc.* v. 103. 3, ☿.
Diacamma vagans, *Roger, Berl. Ent. Zeitschr.* (1863), 16.
Hab. Bachian.

43. P. striata, *Smith, Proc. Linn. Soc.* v. 104. 4, ☿.
Hab. Bachian.

44. P. simillima, *Smith, Proc. Linn. Soc.* v. 104. 5, ☿.
Hab. Bachian; New Guinea.

45. P. cuprea, *Smith, Proc. Linn. Soc.* v. 104. 6, ♀.
Hab. Bachian.

46. P. nominata, *Smith* (simillima), *Proc. Linn. Soc.* v. 105. 7.
Hab. Dory.

47. P. bispinosa, *Le Guillou, Ann. Soc. Ent. Fr.* (1841), x. 317. 14, ☿.
Diacamma bispinosum, *Roger, Berl. Ent. Zeitschr.* (1863), 18.
Hab. Ternate.

48. P. rugosa, *Le Guillou, Ann. Soc. Ent. Fr.* (1841), x. 318. 15, ☿.
Diacamma rugosum, *Mayr, Myrm. Stud.* p. 78. 1.
Hab. Borneo.

49. P. holoserica, *Roger, Berl. Ent. Zeitschr.* (1860), 302. 27, ☿.
Diacamma holosericum, *Roger, Berl. Ent. Zeitschr.* (1863), p. 16.
Hab. Java.

50. P. araneoides, *Le Guillou, Ann. Soc. Ent. Fr.* (1841), x. 317. 13.
Ectatomma rugosum, *Roger, Berl. Ent. Zeitschr.* (1863), p. 17 (nec *Smith*).
Hab. Ceylon.

51. P. (Formica) exudans, *Walk. Ann. & Mag. Nat. Hist.* (1859) iv. 371, ♂.
Hab. Ceylon.

52. P. (Formica) mentans, *Walk. Ann. & Mag. Nat. Hist.* (1859) iv. 371, ♂.
Hab. Ceylon.

1. PACHYCONDYLA MELANCHOLICA, *Smith, Proc. Linn.* 71. 1, ☿.
Hab. Morty Island.

Gen. ECTATOMMA, *Smith.*

1. ECTATOMMA RUGOSA, *Smith, Proc. Linn. Soc.* iii. 143. 1,
Hab. Aru; Ceram; Sula.

Gen. AMBLYOPONE, *Erichs.*

1. AMBLYOPONE CASTANEA, *Smith, Proc. Linn. Soc.* v. 105.
Hab. Bachian; Ceram.

2. A.? TESTACEA, *Motsch. Bull. Imp. Soc. des Nat. Mosc* 15, ♀.
Hab. Ceylon (Colombo).

Gen. ANOMMA, *Shuck.*

1. ANOMMA ERRATICA, *Smith, Proc. Linn. Soc.* viii. 71. 1, ♀
Hab. New Guinea.

Gen. TYPHLOPONE, *West.*

1. TYPHLOPONE LÆVIGATA, *Smith, Proc. Linn. Soc.* ii. 70. 1
Hab. Singapore.

Gen. MESOXENA, *Smith.*

1. MESOXENA MISTURA, *Smith, Proc. Linn. Soc.* v. 107. 1, ☿
Hab. Bachian.

3. Myrmica agilis, *Smith, Proc. Linn. Soc.* ii. 71. 4.
Hab. Malacca.

4. M. (Monomorium?) vastator, *Smith, Proc. Linn. Soc.* ii. 71. 3.
Hab. Malacca.

5. M. parallela, *Smith, Proc. Linn. Soc.* iii. 147. 1, ♀.
Hab. Aru.

6. M. scabrosa, *Smith, Proc. Linn. Soc.* iii. 147. 2, ☿.
Hab. Aru.

7. M. thoracica, *Smith, Proc. Linn. Soc.* iii. 148. 3, ☿.
Hab. Aru.

8. M. mellea, *Smith, Proc. Linn. Soc.* iii. 148. 5, ☿.
Hab. Aru.

9. M. carinata, *Smith, Proc. Linn. Soc.* iii. 148. 6, ☿.
Hab. Aru.

10. M. gracilescens, *Smith, Proc. Linn. Soc.* v. 74. 2, ☿.
Hab. Celebes.

11. M. poneroides, *Smith, Proc. Linn. Soc.* v. 107. 2, ☿.
Hab. Bachian; Ceram; Bouru.

12. M. oblonga, *Smith, Proc. Linn. Soc.* v. 107. 1, ☿.
Hab. Bachian.

13. M. punctata, *Smith, Proc. Linn. Soc.* v. 108. 3, ☿.
Hab. Bachian.

14. M. modesta, *Smith, Proc. Linn. Soc.* v. 108. 4, ☿.
Hab. Bachian.

15. M. lævissima, *Smith, Proc. Linn. Soc.* v. 108. 5, ♀.
Hab. Bachian.

16. M. polita, *Smith, Proc. Linn. Soc.* v. 108. 6, ☿.
Hab. Bachian.

17. M. cæca, *Smith, Proc. Linn. Soc.* v. 108. 7, ☿.
Hab. New Guinea.

18. M. molesta, *Say, Bost. Journ. Nat. Hist.* i. 293. 6; *Smith, Cat. Brit. Hym. Form.* p. 34. 13.
M. domestica, *Shuck. Mag. Nat. Hist.* (1838), p. 628; *Curtis, Trans. Linn. Soc.* xxi. 217. 13; *Nyl. Form. Fr. et d'Algér.* 98. 26.
M. Pharaonis, *Roger, Berl. Ent. Zeitschr.* (1862); *Mayr, Myrm. Stud.* 752. 1.
Formica Pharaonis, *Linn. Syst. Nat.* ii. 963. 8?
Hab. Europe; Egypt; Cape of Good Hope; Celebes; India; Philippines; Australia; Canada; New York; South America; Brazil.

19. MYRMICA PEDESTRIS, *Smith, Proc. Linn. Soc.* vi. 46. 2, ♀.
Hab. Celebes.

20. M. RUFICEPS, *Smith, Proc. Linn. Soc.* vi. 46. 3, ♀.
Hab. Celebes.

21. M. FUSCIPENNIS, *Smith, Proc. Linn. Soc.* vi. 46. 4, ♀.
Hab. Celebes.

22. M. PERTINAX, *Smith, Proc. Linn. Soc.* vi. 46. 5, ☿.
Hab. Celebes.

23. M. VEXATOR, *Smith, Proc. Linn. Soc.* vi. 47. 6, ☿.
Hab. Ternate.

24. M. INSOLENS, *Smith, Proc. Linn. Soc.* vi. 47. 7, ☿.
Hab. Menado.

25. M. OPACA, *Smith, Proc. Linn. Soc.* vi. 47. 8, ☿.
Hab. Celebes.

26. M. INCERTA, *Smith, Proc. Linn. Soc.* vii. 21. 2, ☿.
Crematogaster incerta?
Hab. Mysol.

27. M. MŒSTA, *Smith, Proc. Linn. Soc.* vii. 21. 3, ☿.
Hab. Martabello.

28. M. UMBRIPENNIS, *Smith, Proc. Linn. Soc.* vii. 21. 4, ☿.
Hab. Mysol.

29. M.? QUADRISPINOSA, *Smith, Proc. Linn. Soc.* viii. 72. 2, ☿, pl. 4. fig. 6.
Hab. Salwatty.

30. M. MALIGNA, *Smith, Proc. Linn. Soc.* viii. 72. 3, ☿.
Hab. Morty Island.

31. M. ASPERSA, *Smith, Proc. Linn. Soc.* viii. 72. 4, ☿.
Hab. Morty Island.

32. M. DILIGENS, *Smith, Proc. Linn. Soc.* viii. 73. 5, ☿.
Hab. New Guinea.

33. M. HUMILIS, *Smith, Cat. Hym. Ins. Form.* vi. 123. 38, ☿.
Hab. India (Bombay).

34. M. RUGIFRONS, *Smith, Cat. Hym. Ins. Form.* vi. 124. 39, ☿.
Hab. India; Penang.

35. M. BIDENTATA, *Smith, Cat. Hym. Ins. Form.* vi. 124. 40, ☿.
Hab. Calcutta.

36. M. FRAGILIS, *Smith, Cat. Hym. Ins. Form.* vi. 124. 42, ☿.
Hab. Singapore.

37. MYRMICA BASALIS, *Smith, Cat. Hym. Ins. Form.* vi 125. 43, ☿.
Hab. Ceylon.

38. M. CONTIGUA, *Smith, Cat. Hym. Ins. Form.* vi. 125. 44, ♀.
Hab. Ceylon.

39. M. (MONOMORIUM) GLYCIPHILA, *Cat. Hym. Ins. Form.* vi. 125. 45.
Hab. Ceylon.

40. M. TRACHYLISSA, *Smith, Cat. Hym. Ins. Form.* vi. 126. 47, ♀.
Hab. Borneo.

41. M.? CONSTERNENS, *Walk. Ann. & Mag. Nat. Hist.* (1859) iv. 374, ♂, ♀.
Hab. Ceylon.

42. M. PALLINODIS, *Motsch. Bull. Soc. Nat. Mosc.* (1863), 16, ☿.
Hab. Ceylon.

43. M. OBSCURATA, *Motsch. Bull. Soc. Nat. Mosc.* (1863), 16, ☿.
Hab. Ceylon.

Gen. MYRMECINA, *Curtis*.

1. MYMECINA PILICORNIS, *Smith, Cat. Hym. Ins. Form.* vi. 133. 2, ♂
Hab. India (Bombay).

Gen. PODOMYRMA, *Smith*.

1. PODOMYRMA FEMORATA, *Smith, Proc. Linn. Soc.* iii. 145. 1, ♀.
Hab. Aru.

2. P. STRIATA, *Smith, Proc. Linn. Soc.* iii. 146. 2, ☿.
Hab. Aru.

3. P. LÆVIFRONS, *Smith, Proc. Linn. Soc.* iii. 146. 3, ☿.
Hab. Aru.

4. P. BASALIS, *Smith, Proc. Linn. Soc.* iii. 147. 4, ☿, ♀.
Hab. Aru; Amboyna; New Guinea; Mysol; Bouru.

5. P. NITIDA, *Smith, Proc. Linn. Soc.* v. 110. 2, ☿.
Hab. New Guinea.

6. P. SILVICOLA, *Smith, Proc. Linn. Soc.* v. 110. 3, ☿.
Hab. Bachian; Morty Island.

7. P. SIMILLIMA, *Smith, Proc. Linn. Soc.* v. 111. 4, ☿.
Hab. Bachian.

8. P. LÆVISSIMA, *Smith, Proc. Linn. Soc.* vii. 20. 2, ☿.
Hab. Mysol.

9. P. RUFICEPS, *Smith, Proc. Linn. Soc.* vii. 203, ☿.
Hab. Mysol.

3. P. CARBONARIA, *Smith, Proc. Linn. Soc.* vii. 20. 2, ☿
Hab. Bouru.

4. P. (ECITON) RUFONIGRA, *Jerdon, Madr. Journ.* iii.
Proc. Linn. Soc. viii. 73. 2; *Cat. Hym. Ins. Form.* vi.
Sima rufo-nigra, *Roger, Berl. Ent. Zeitschr.* (1863), sp. (
Hab. India; Morty Island.

5. P. MODESTA, *Smith, Proc. Linn. Soc.* v. 106. 2, ☿.
Hab. Bachian.

6. P. NITIDA, *Smith, Proc. Linn. Soc.* v. 106. 3, ☿.
Hab. Bachian.

7. P. (ECITON) RUFIPES, *Jerdon, Madr. Journ.* (1851),
& Mag. Nat. Hist. 2nd ser. xiii. 53; *Smith, Cat. Hy*
vi. 159. 23.
Hab. India (Salem district).

8. P. (ECITON) MINUTA, *Jerdon, Madr. Journ.* (1851),
& Mag. Nat. Hist. 2nd ser. xiii. 53.
Hab. India (the Carnatic and Malabar).

9. P. (ECITON) NIGRA, *Jerdon, Madr. Journ.* (1851), 11
Mag. Nat. Hist. 2nd ser. xiii. 53; *Smith, Cat. Hym.*
159. 25.
Hab. India (the Carnatic and Malabar).

Gen. LEPTOMYRMA, *Motsch.*

1. LEPTOMYRMA GRACILIPES, *Motsch. Bull. Soc. Imp. Nat. Mosc.* (1863), 17, ☿.
Pheidole (worker minor?).
Hab. Ceylon (mountains of Nura Ellia).

Gen. CERAPACHYS, *Smith.*

1. CERAPACHYS ANTENNATUS, *Smith, Proc. Linn. Soc.* ii. 74. 1, ☿.
Hab. Borneo; Celebes.

2. C. OCULATUS, *Smith, Proc. Linn. Soc.* ii. 74. 2, ♂.
Hab. Borneo.

3. C. FEMORALIS, *Motsch. Bull. Soc. Imp. Nat. Mosc.* (1863), 21.
Hab. Ceylon.

4. C. CEYLONICA, *Motsch. Bull. Soc. Imp. Nat. Mosc.* (1863), 22.
Hab. Ceylon.

Gen. CREMATOGASTER, *Lund.*

1. CREMATOGASTER KIRBII, *Smith, Cat. Hym. Ins. Form.* vi. 136. 4.
Myrmica Kirbii, *Sykes, Trans. Ent. Soc. Lond.* i. 99, pl. 13. figs. 2, 3.
Hab. India (Poona).

2. C. ANTHRACINUS, *Smith, Proc. Linn. Soc.* ii. 75. 1, ☿; *Cat. Hym. Ins. Form.* vi. 136. 5.
Hab. Singapore; Ceylon.

3. C. BRUNNEUS, *Smith, Proc. Linn. Soc.* ii. 75. 2, ☿; *Cat. Hym. Ins. Form.* vi. 138. 10.
Hab. Borneo; Ceylon.

4. C. CEPHALOTES, *Smith, Proc. Linn. Soc.* ii. 75. 3, ☿; *Cat. Hym. Ins. Form.* vi. 137. 9.
Hab. Borneo; Aru.

5. C. OBSCURUS, *Smith, Proc. Linn. Soc.* ii. 76. 4, ☿.
Hab. Borneo; Bachian; Aru.

6. C. INFLATUS, *Smith, Proc. Linn. Soc.* ii. 76. 5, ☿; *Cat. Hym. Ins. Form.* vi. 136. 6, pl. 9. f. 1.
Hab. Borneo; Birmah; Singapore.

7. C. DIFFORMIS, *Smith, Proc. Linn. Soc.* ii. 76. 6, ☿; *Cat. Hym. Ins. Form.* vi. 137. 7.
Hab. Borneo; Celebes; Singapore.

8. C. OCHRACEA, *Mayr, Myrm. Stud. Zool. Botan. Gesell.* (1862), 766. 5, ☿.
Hab. Manilla.

Hab. Java.

3. M. (Heptacondylus) subcarinata, *Smith, Proc. Linn. Soc.* ii. 73. 2, ☿; *Cat. Hym. Ins. Form.* vi. 172. 1.
Hab. Borneo.

4. M. (Heptacondylus) carinata, *Smith, Proc. Linn. Soc.* ii. 73. 3, ☿; *Cat. Hym. Ins. Form.* vi. 172. 2.
Hab. Borneo.

5. M. (Heptacondylus) arachnoides, *Smith, Proc. Linn. Soc* ii. 72. 1, ☿.
Hab. Borneo.

6. M. (Heptacondylus) longipes, *Smith, Cat. Hym. Ins. Form.* vi. 142. 3, ☿.
Hab. Borneo.

7. M. (Physatta) dromedarius, *Smith, Proc. Linn. Soc.* ii. 78. 1 *Cat. Hym. Ins. Form.* vi. 171. 1, pl. x. figs. 9-11.
Hab. Borneo.

8. MYRMICARIA (PHYSATTA) CRINITA, *Smith, Cat. Hym. Ins. Form.* vi. 171. 2, ♀ (M. brunnea, ♀?).
Hab. India (Madras).

9. M. (PHYSATTA) GIBBOSA, *Smith, Cat. Hym. Ins. Form.* vi. 172. 3, ♀.
Hab. Java.

Gen. PHEIDOLE, *Westw.*

1. PHEIDOLE (ATTA) PROVIDENS, *Sykes, Trans. Ent. Soc. Lond.* i. 103, pl. 13. f. 7, f. 5; *Westw. Ann. & Mag. Nat. Hist.* vi. 87 (1841); *Jerdon, Madr. Journ.* (1851), 108; *Ann. & Mag. Nat. Hist.* (1854) xiii. 50. 8.
Hab. India (Poona).

2. P. (ŒCODOMA) MALABARICA, *Jerdon, Madr. Journ.* (1851), 107; *Ann. & Mag. Nat. Hist.* (1854) xiii. 49.
Hab. India.

3. P. (ŒCODOMA) DIFFUSA, *Jerdon, Madr. Journ.* (1851), 109; *Ann. & Mag. Nat. Hist.* (1854) xiii. 51. 9.
Hab. India.

4. P. (ŒCODOMA) DIVERSA, *Jerdon, Madr. Journ.* (1851), 109; *Ann. & Mag. Nat. Hist.* (1854) xiii. 51. 10.
Hab. India (Wynaad).

5. P. (ŒCODOMA) AFFINIS, *Jerdon, Madr. Journ.* (1851), 110; *Ann. & Mag. Nat. Hist.* (1854) xiii. 51. 11.
Hab. India (Malabar).

6. P. (ŒCODOMA) MINOR, *Jerdon, Madr. Journ.* (1851), 110; *Ann. & Mag. Nat. Hist.* (1854) xiii. 51. 12.
Hab. India (Tellicherry).

7. P. (ŒCODOMA) QUADRISPINOSA, *Jerdon, Madr. Journ.* (1851), 111; *Ann. & Mag. Nat. Hist.* (1854) xiii. 52.
Hab. India (Malabar).

8. P. OCELLIFERA, *Smith, Cat. Hym. Ins. Form.* vi. 174. 10, ☿.
Pheidologeton ocellifera, *Mayr, Myrm. Stud. Zool. Botan. Gesell.* (1862), 750. 1.
Hab. Birmah; Hong Kong; Philippines.

9. P. JANUS, *Smith, Cat. Hym. Ins. Form.* vi. 175. 11, pl. ix. figs. 13, 17, ☿.
Hab. Ceylon.

10. P. TAPROBANÆ, *Smith, Cat. Hym. Ins. Form.* vi. 175. 12, ♂.
Pheidologeton Taprobane, *Roger, Berl. Ent. Zeitschr.* (1863), 30.
Hab. Ceylon.

20. P. MEGACEPHALA, *Smith, Proc. Linn. Soc.* v. 112. 5, ☿.
Pheidologeton megacephalus, *Roger, Berl. Ent. Zeitschr.* (1863), 30.
Hab. Bachian; Celebes; Timor; Tondano; Sula.

21. P. SINGULARIS, *Smith, Proc. Linn. Soc.* vii. 22. 2, ☿.
Hab. Mysol.

22. P. MORDAX, *Smith, Proc. Linn. Soc.* vii. 22. 3, ☿.
Hab. Mysol.

23. P. PENETRALIS, *Smith, Proc. Linn. Soc.* vii. 23. 4, ☿.
Hab. Mysol.

24. P. HOSPES, *Smith, Proc. Linn. Soc.* viii. 74. 2, ☿.
Hab. New Guinea.

25. P. SULCATICEPS, *Roger, Berl. Ent. Zeitschr.* (1863), 85, ♂, ♀, ☿.
Hab. Ceylon.

26. P. LATINODA, *Roger, Berl. Ent. Zeitschr.* (1863), 195. 86, ☿.
Hab.-Ceylon.

27. P. NANUS, *Roger, Berl. Ent. Zeitschr.* (1863), 191. 84.
Pheidologeton, *Mayr, Myrm. Stud. Zool. Botan. Gesell.* (1862).
Hab. Ceylon.

28. PHEIDOLE (ATTA) DIDITA, *Walk. Ann. & Mag. Nat. Hist.* (1859) iv. 375, ☿.
Hab. Ceylon.

29. P. (ŒCOPHTHORA) CEYLONICA, *Motsch. Bull. Soc. Imp. Nat. Mosc.* (1863), 18, ♂, ♀, ☿.
Hab. Ceylon (Colombo and mountains of Nura Ellia and Patannas).

30. P. (SOLENOPSIS) PUNGENS, *Smith, Proc. Linn. Soc.* vi. 48, ☿.
Hab. Menado.

Gen. PHEIDOLACANTHINUS, *Smith.*

1. PHEIDOLACANTHINUS ARMATUS, *Smith, Proc. Linn. Soc.* viii. 75. 1, pl. iv. fig. 8, ☿.
Hab. Salwatty.

Gen. SOLENOPSIS, *Westw.*

1. SOLENOPSIS CEPHALOTES, *Smith, Proc. Linn. Soc.* iii. 149. 1.
Hab. Aru; Bachian; Celebes; Ceram.

2. S. TRANSVERSALIS, *Smith, Proc. Linn. Soc.* v. 74. 1, ♀.
Hab. Aru.

3. S. LABORIOSA, *Smith, Proc. Linn. Soc.* vi. 48. 2, ☿.
Hab. Celebes; Waigiou.

4. S. CALIDA, *Smith, Proc. Linn. Soc.* vii. 22. 3, ♀.
Hab. Ceram.

5. S. LÆVIS, *Smith, Proc. Linn. Soc.* viii. 75. 1, ☿.
Hab. Morty Island.

Gen. ATTA, *Latr.*

1. ATTA INSTABILIS, *Smith, Cat. Hym. Ins. Form.* vi. 163. 10, ☿.
Hab. N. India.

2. A. BELLICOSA, *Smith, Cat. Hym. Ins. Form.* vi. 164. 11, ☿.
Hab. Birmah.

3. A. NODIFER, *Smith, Cat. Hym. Ins. Form.* vi. 165. 44, ☿.
Hab. North China.

4. A. CINGULATA, *Smith, Proc. Linn. Soc.* ii. 77. 2, ☿.
Hab. Borneo.

5. A. PENETRANS, *Smith, Proc. Linn. Soc.* ii. 77. 1, ♀.
Hab. Borneo.

Gen. TYPHLATTA, *Smith.*

1. TYPHLATTA LÆVICEPS, *Smith, Proc. Linn. Soc.* ii. 79. 1, ☿.
Hab. Borneo.

Gen. Strumigenys, *Smith*.

1. Strumigenys (Labidogenys) lyroessa, *Roger, Berl. Zeitschr.* (1862), 251, Taf. 1. fig. 17, ☿.
Hab. Ceylon.

Fam. CRYPTOCERIDÆ, *Smith*.

Gen. Meranoplus, *Smith*.

1. Meranoplus castaneus, *Smith, Proc. Linn. Soc.* ii. 8 *Cat. Hym. Ins. Form.* vi. 194. 5.
Hab. Borneo.

2. M. cordatus, *Smith, Proc. Linn. Soc.* ii. 82. 2, ☿; *Cat. H Form.* vi. 193. 3.
Hab. Borneo.

3. M. mucronatus, *Smith, Proc. Linn. Soc.* ii. 82. 3, ☿; *Ca Ins. Form.* vi. 194. 4.
Hab. Malacca.

4. M. (Cryptocerus) bicolor, *Guér. Icon. Règ. Anim.* p. 425; *Mon. Crypt., Trans. Ent. Soc. Lond.* 2nd. ser. ii. 224. 1.
M. villosus, *Motsch. Etud. Ent.* (1859), p. 115.
M. dimicans, *Walk. Ann. & Mag. Nat. Hist.* (1859), iv. 375. ☿.
Hab. India (Pondicherry); Ceylon.

5. M. spinosus, *Smith, Proc. Linn. Soc.* iii. 150. 1.
Hab. Aru.

4. CATAULACUS TAPROBANE, *Smith, Mon. Crypt., Trans. Ent. Soc. Lond* 2nd. ser. ii. 225. 1, pl. 20. fig. 10, ☿; *Cat. Hym. Ins. Form.* vi. 195. 1.
Hab. Ceylon.

5. C. GRANULATUS, *Smith, Mon. Crypt., Trans. Ent. Soc. Lond.* new ser. ii. 226. 4; *Cat. Hym. Ins. Form.* 196. 4.
Formica granulata, *Latr. Hist. Nat. Fourm.* p. 275, pl. 12. fig. 75, ☿.
Cyptocerus granulatus, *St.-Farg. Hym.* i. 171. 2.
Hab. India.

6. C. INSULARIS, *Smith, Proc. Linn. Soc.* ii. 80. 1, ♂; *Cat. Hym. Ins. Form.* vi. 197. 7.
Hab. Borneo.

7. C. HORRIDUS, *Smith, Proc. Linn. Soc.* ii. 81. 2, ☿; *Cat. Hym. Ins. Form.* vi. 196. 5.
Hab. Borneo; Malacca.

8. C. RETICULATUS, *Smith, Proc. Linn. Soc.* v. 81. 3, ☿; *Cat. Hym. Ins. Form.* vi. 196. 6.
Hab. Malacca.

Gen. CEPHALOXYS, *Smith*.

1. CEPHALOXYS CAPITATA, *Smith, Proc. Linn. Soc.* viii. 77. 1, ♀.
Hab. New Guinea.

Fam. DORYLIDÆ, *Shuck*.

Gen. DORYLUS, *Latr*.

1. DORYLUS LABIATUS, *Shuck. Ann. & Mag. Nat. Hist.* (1840), v. 319. 6; *West. Arc. Ent.* i. 80. 6.
Hab. India (Poonah and Assam).

2. D. HINDOSTANUS, *Smith, Cat. Hym. Ins. Dor. & Thynn.* vii. 3. 7.
Hab. India (Punjaub).

3. D. ORIENTALIS, *Westw. Proc. Zool. Soc.* (1835), p. 72; *Arc. Ent.* i. 80. 7; *Shuck. Mon. Dor., Ann. & Mag. Nat. Hist.* (1840) v. 320. 7.
Hab. India (Bengal).

4. D. LONGICORNIS, *Shuck. Mon. Dor., Ann. & Mag. Nat. Hist.* (1840) v. 321. 8; *West. Arc. Ent.* i. 80. 8.
Hab. India.

2. M. FUSCIPENNIS, *St.-Farg. Hym.* iii. 602. ♂.
Hab. Java.

3. M. DIMIDIATA, *St.-Farg. Hym.* iii. 628. 50, ♂.
Hab. India.

4. M. BENGALENSIS, *St.-Farg. Hym.* iii. 637. 63, ♀.
Hab. Bengal.

5. M. GLABRATA, *Fabr. Syst. Piez.* p. 438. 45, ♀; *Oliv. Ency. Méth.* viii. 65. 64.
Hab. India.

6. M. INDICA, *Linn. Syst. Nat.* i. 966 3, ♀.
Hab. India.

7. M. NIGRIPES, *Fabr. Syst. Piez.* p. 439. 51, ♀.
Hab. India.

8. M. RUFOGASTRA, *St.-Farg. Hym.* iii. 629. 51, ♂.
Hab. India; China; Celebes.

9. M. RUGOSA, *Oliv. Ency. Méth.* viii. 61. 35, ♀.
Hab. India.

10. Mutilla sexmaculata, *Swed. Nov. Act. Holm.* viii. 286. 44, ♀.
M. fuscipennis, *Fabr. Syst. Piez.* p. 436. 35, ♂.
Hab. India.

11. M. oculata, *Fabr. Syst. Piez.* p. 432. 19, ♀; *Oliv. Ency. Méth.* viii. 60. 32.
Hab. Hong Kong.

12. M. antennata, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 31. 166, ♂.
Hab. India.

13. M. argentipes, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 31. 167, ♀.
Hab. India.

14. M. aurifrons, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 31. 168, ♀.
Hab. India.

15. M. blanda, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 32. 170, ♀.
Hab. India; Malacca.

16. M. diversa, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 32. 171, ♀.
Hab. India.

17. M. dives, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 32. 172, ♀.
Hab. India.

18. M. indostana, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 33. 175, ♂.
Hab. Madras.

19. M. miranda, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 33. 176, ♀.
Hab. India.

20. M. nobilis, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 33. 178.
Hab. Madras.

21. M. optima, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 34. 179, ♀.
Hab. India.

22. M. opulenta, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 34. 180, ♂.
Hab. India.

23. M. pulchrina, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 34. 181, ♀.
Hab. Madras.

Hab. N. India.

32. M. UNIFASCIATA, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 38. 193, ♂.
Hab. N. India; Celebes.

33. M. CHINENSIS, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 38. 194, ♀.
Hab. N. China.

34. M. DESPONSA, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 38. 195, ♂.
Hab. N. China.

36. M. VARIEGATA, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 39. 196, ♀.
Hab. N. China.

36. M. SINENSIS, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 39. 198, ♂, ♀.
Hab. Hong Kong.

37. M. SPECIOSA, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 40. 199, ♀.
Hab. Hong Kong

38. MUTILLA PHILIPPINENSIS, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 40. 200, ♀.
Hab. Philippines.

39. M. DEIDAMIA, *Smith, Proc. Linn. Soc.* ii. 83. 3, ♀.
Hab. Borneo.

40. M. URANIA, *Smith, Proc. Linn. Soc.* ii. 83. 4, ♀.
Hab. Borneo.

41. M. SUSPICIOSA, *Smith, Proc. Linn. Soc.* ii. 84. 5, ♂.
Hab. Borneo; Bachian; Celebes; Amboyna; Bouru; Flores.

42. M. GRACILLIMA, *Smith, Proc. Linn. Soc.* ii. 84. 6, ♂.
Hab. Borneo.

43. M. FAMILIARIS, *Smith, Proc. Linn. Soc.* ii. 84. 7, ♀.
Hab. Singapore; Borneo.

44. M. CALLIOPE, *Smith, Proc. Linn. Soc.* ii. 85. 8, ♀.
Hab. Borneo.

45. M. PROSERPINA, *Smith, Proc. Linn. Soc.* ii. 85. 9, ♀.
Hab. Borneo.

46. M. PANDORA, *Smith, Proc. Linn. Soc.* ii. 85. 10, ♀.
Hab. Borneo.

47. M. SIBYLLA, *Smith, Proc. Linn. Soc.* ii. 86. 11, ♀*.
Hab. Borneo; Celebes; Aru.

48. M. CASSIOPE, *Smith, Proc. Linn. Soc.* ii. 86. 12, ♀.
Hab. Borneo.

49. M. DARDANUS, *Smith, Proc. Linn. Soc.* ii. 86. 13, ♀.
Hab. Borneo.

50. M. UNIMACULATA, *Smith, Proc. Linn. Soc.* ii. 87. 14, ♀.
Hab. Borneo; Celebes.

51. M. VOLATILIS, *Smith, Proc. Linn. Soc.* iii. 9. 4, ♂.
Hab. Celebes.

52. M. MANIFESTA, *Smith, Proc. Linn. Soc.* iii. 150, 2, ♂, ♀.
Hab. Aru.

53. M. CARINATA, *Smith, Proc. Linn. Soc.* iii. 150. 3, ♀.
Hab. Aru.

54. M. NIGRA, *Smith, Proc. Linn. Soc.* iii. 151. 4, ♂.
Hab. Aru; Celebes.

55. M. EXILIS, *Smith, Proc. Linn. Soc.* iii. 151. 5, ♂.
Hab. Aru.

* No. 41 is the male of this species, taken *in coitu*.

Hab. Bachian; New Guinea.

66. M. Doricha, *Smith, Proc. Linn. Soc.* v. 116. 7, ♀.
Hab. New Guinea (Dory); Bachian; Ceram; Amboyna.

67. M. mirabilis, *Smith, Proc. Linn. Soc.* vii. 24. 5, ♂.
Hab. Waigiou.

68. M. Damia, *Smith, Proc. Linn. Soc.* vii. 24. 6, ♂.
Hab. Ceram.

69. M. Thera, *Smith, Proc. Linn. Soc.* vii. 24. 7, ♀.
Hab. Ceram.

70. M. fausta, *Smith, Proc. Linn. Soc.* vii. 25. 8, ♀.
Hab. Mysol.

71. M. agilis, *Smith, Proc. Linn. Soc.* viii. 79. 5, ♂.
Hab. New Guinea.

72. M. fluctuata, *Smith, Proc. Linn. Soc.* viii. 80. 6, ♂
Hab. Morty Island.

Gen. Apterogyna, *Latr.*

1. Apterogyna mutilloides, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 64. 5, ♂, ♀.
Hab. India.

Gen. Myrmosida, *Smith.*

1. Myrmosida paradoxa, *Smith, Proc. Linn. Soc.* ii. 88. 1, ♀, tab. 2. fig. 1.
Hab. Singapore.

Fam. THYNNIDÆ, *Erichs.*

Gen. Thynnus, *Fabr.*

1. Thynnus erraticus, *Smith, Proc. Linn. Soc.* v. 114. 1, ♂.
Hab. Bachian.

2. T. atratus, *Smith, Proc. Linn. Soc.* vi. 51. 1, ♂, & viii. 77. 2, ♀.
Hab. Gilolo.

3. T. (Agriomyia) vagans, *Smith, Proc. Linn. Soc.* vi. 51. 2, ♂, ♀.
Hab. Gilolo.

4. T. lugubris, *Smith, Proc. Linn. Soc.* vii. 25. 1, ♂.
Hab. Ceram.

5. T. insularis, *Smith, Proc. Linn. Soc.* vii. 26. 2, ♀.
Hab. Mysol.

6. T. placidus, *Smith, Proc. Linn. Soc.* vii. 26. 3, ♂.
Hab. Waigiou.

7. T. pullatus, *Smith, Proc. Linn. Soc.* vii. 26. 4, ♂, ♀.
Hab. Bouru.

8. T. lævissimus, *Smith, Proc. Linn. Soc.* viii. 77. 1, ♀.
Hab. New Guinea.

9. T. (Agriomyia) abductor, *Smith, Proc. Linn. Soc.* viii. 78. 3, ♂.
Hab. Salwatty; New Guinea.

Gen. Ælurus, *Klug.*

1. Ælurus comatus, *Smith, Proc. Linn. Soc.* vii. 27. 1, ♂.
Hab. Waigiou.

Gen. Iswara, *Westw.*

1. Iswara luteus, *Westw. Trans. Ent. Soc. Lond.* new ser. i. pl. 7. fig. 5.
Hab. India.

2. T. HIRSUTA, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 83. 5, ♂.
Hab. N. India.

3. T. RUFIPES, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 83. 6, ♀.
Hab. N. India.

4. T. RUFO-FEMORATA, *Smith, Cat. Hym. Ins. Mut. & Pomp.* iii. 83. 7, ♀.
Hab. N. India.

5. T. FUMIPENNIS, *Smith, Proc. Linn. Soc.* ii. 90. 1, ♀.
Hab. Borneo.

6. T. STIGMA, *Smith, Proc. Linn. Soc.* ii. 91. 2, ♂.
Hab. Borneo.

7. T. FLAVIPENNIS, *Smith, Proc. Linn. Soc.* ii. 91. 3, ♀.
Hab. Borneo.

8. T. CARBONARIA, *Smith, Proc. Linn. Soc.* v. 118. 1, ♀.
Hab. Bachian.

9. T. INTRUDENS, *Smith, Proc. Linn. Soc.* vii. 25. 1, ♀.
Hab. Mysol.

Gen. Myzine, *Latr.*

1. Myzine tricolor, *Smith, Proc. Linn. Soc.* ii. 91. 1, ♀.
Hab. Borneo.

2. M. tenuicornis, *Smith, Proc. Linn. Soc.* iii. 151. 1, ♂.
Hab. Aru.

Gen. Scolia, *Fabr.*

Div. 1. The anterior wings with three submarginal cells and one recurrent nervure.

(Subgenus *Triscolia*, Sauss. & Sich.)

1. Scolia procer, *Illig. Mag.* i. 196. 26, ♂, ♀; *Fabr. Syst. Piez.* p. 238. 1; *Burm. Mon. Scol.* p. 19. 9.
S. capitata, *Fabr. Syst. Piez.* p. 239. 3, ♂; *Smith, Cat. Hym. Ins.* iii. 111. 122.
Triscolia procer, *Sauss. & Sich. Cat. Spec. Gen. Scol.* 43. 16.
Scolia patricialis, *Sauss. & Sich.* (nec *Burm. & Smith*).
Hab. Java; Sumatra; Singapore.

2. S. patricialis, *Burm. Mon. Scol.* p. 19. 10; *Smith, Cat. Hym. Ins.* iii. 110. 121.
Hab. Malabar; Sumatra; China (Penang).

3. S. nudata, *Smith, Cat. Hym. Ins.* iii. 110. 120.
Hab. North Bengal.

4. S. rubiginosa, *Fabr. Syst. Piez.* p. 241. 10; *Klug, Weber & Mohr, Beitr.* ii. 211. 38; *St.-Farg. Hym.* iii. 518. 2; *Burm. Mon. Scol.* p. 19. 11; *Smith, Cat. Hym. Ins.* iii. 111. 123; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 45. 20.
S. ornata, *St.-Farg. Hym.* iii. 517. 1, ♀.
Hab. India; China; Borneo; Java; Malacca; Siam.

5. S. capitata, *Guér. Voy. Coq.* p. 248, ♂; *Burm. Mon. Scol.* p. 20. 13; *Smith, Cat. Hym. Ins.* iii. 114. 137; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 47. 23.
S. ruficeps, *Smith, Cat. Hym. Ins.* iii. 111. 126, ♀.
Hab. Philippines.

6. S. cincta, *Smith, Proc. Linn. Soc.* ii. 89. 7, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 45. 19.
Hab. Borneo; Sumatra; Sulla; Java.

7. S. opalina, *Smith, Proc. Linn. Soc.* ii. 89. 9, ♂, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 42. 15.
Hab. Borneo.

15. S. Kollari, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 40. 10, ♀.
Hab. Java.

16. S. foraminata, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 40. 11, ♂.
Hab. Java.

17. S. velutina, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 41. 13, ♂.
Hab. Java.

18. S. magnifica, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 44. 18, ♀.
Hab. Java.

19. S. insignis, *Saup. & Sich. Cat. Spec. Gen. Scol.* p. 47. 22, ♀.
Hab. India; Persia?

Div. 2. The anterior wings with two submarginal cells and one recurrent nervure.

(Subgenus *Discolia*, Sauss. & Sich.)

20. S. cærulans, *St.-Farg. Hym.* iii. 526. 11; *Smith. Cat. Hym. Ins.* iii. 87. 8; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 104. 92.
Hab. India.

21. SCOLIA CYANIPENNIS, *Fabr. Syst. Piez.* p. 244. 35; *Burm. Mon. Scol.* p. 37. 59; *Smith, Cat. Hym. Ins.* iii. 90. 21; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 103. 91.
Hab. Java; Ceylon.

22. S. DECORATA, *Burm. Mon. Scol.* p. 30. 39.
Hab. Sumatra.

23. S. ERRATICA, *Smith, Cat. Hym. Ins.* iii. 88. 10; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 110. 103.
S. verticalis, *Burm. Mon. Scol.* p. 37. 61 (nec *Fabr.*).
S. Westermanni, *Sauss. Ann. Soc. Ent. Fr.* (1858), 212. 19, ♀.
Hab. India; Java; Borneo; Sumatra.

24. S. 4-PUSTULATA, *Fabr. Syst. Piez.* p. 244. 34, ♀; *St.-Farg. Hym* iii. 528. 16; *Burm. Mon. Scol.* p. 36. 58; *Smith, Cat. Hym. Ins.* iii. 87. 7; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 113. 108.
S. binotata, *Fabr. Syst. Piez.* p. 244. 36, ♂.
S. bipunctata? *Klug, Weber & Mohr, Breitr.* i. 36. 32.
S. 6-pustulata, *Klug, ibid.* 35. 30. var. ♂.
S. fasciato-punctata, *Guér. Voy. Coq.* ii. 254, var. ♀.
S. fervida, *Smith, Ann. & Mag. Nat. Hist.* iv. ser. 2. 1852; *Cat. Hym. Ins.* iii. 89. 15.
Hab. India; Sumatra; Java.

25. S. INSTABILIS, *Smith, Cat. Hym. Ins.* iii. 88. 11.
Hab. India.

26. S. PULCHRA, *Smith, Cat. Hym. Ins.* iii. 88. 12, ♀.
Hab. India.

27. S. SPECIFICA, *Smith, Cat. Hym. Ins.* iii. 89. 13, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 117. 114.
Hab. India.

28. S. VIVIDA, *Smith, Cat. Hym. Ins.* iii. 89. 14, ♂; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 123. 125.
Hab. India.

29. S. OBSCURA, *St.-Farg. Hym.* iii. 527. 14, ♀; *Smith, Cat. Hym. Ins.* iii. 89. 16; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 113. 107.
Hab. India.

30. S. VENUSTA, *Smith, Cat. Hym. Ins.* iii. 90. 17, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 120. 120.
Hab. India.

31. S. APICICORNIS, *Guér. Voy. Coq.* ii. 235; *Smith, Cat. Hym. Ins.* iii. 90. 18; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 55. 32.
Hab. India? Senegambia?

40. S. NITIDA, *Smith, Proc. Linn. Soc.* iii. 152. 2, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 108. 100.

Hab. Aru; Bachian; Amboyna; Martabello; Bouru; Key; New Guinea; Timor.

41. S. MINUTA, *Smith, Proc. Linn. Soc.* iii. 11. 9, ♂; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 125. 128.

Hab. Celebes.

42. S. INSULARIS, *Smith, Proc. Linn. Soc.* iii. 153. 4, ♂; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 107. 97.

Hab. Key; Aru; Ceram.

43. S. NIGERRIMA, *Smith, Proc. Linn. Soc.* v. 116. 4, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 105. 93.

Hab. Dory (New Guinea).

44. S. CULTA, *Smith, Proc. Linn. Soc.* v. 117. 5, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 122. 123.

Hab. Dory.

45. S. CAPTIVA, *Smith, Proc. Linn. Soc.* vi. 52. 1, ♂; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 107. 98.

Hab. Gilolo; Sumatra.

46. Scolia ambigua, *Smith, Proc. Linn. Soc.* vi. 52. 2, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 108. 99.
Hab. Gilolo.

47. S. dubia, *Smith, Proc. Linn. Soc.* vii. 28. 5, ♂.
Hab. Ceram.

48. S. larradiformis, *Smith, Proc. Linn. Soc.* vii. 28. 6, ♀.
Hab. Waigiou.

49. S. morata, *Smith, Proc. Linn. Soc.* vii. 28. 7, ♂.
Hab. Mysol.

50. S. melanosoma, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 105. 93, ♀.
Hab. Java.

51. S. Redtenbacheri, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 105. 95, ♀.
Hab. Java.

52. S. carbonaria, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 106. 96, ♂, ♀.
Hab. Java.

53. S. molesta, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 111. 104, ♂, ♀.
Hab. Pulo Penang; Singapore; Java; Borneo.

54. S. Vollenhoveni, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 112. 105. ♂, ♀.
Hab. Sumatra.

55. S. bilunata, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 115. 109, ♂.
Hab. Nepaul.

56. S. bioculata, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 115. 110, ♀.
Hab. Java; Sumatra.

57. S. splendida, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 116. 112, ♂.
Hab. India.

58. S. nobilis, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 117. 113, ♀.
Hab. India.

59. S. stizus, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 118. 115, ♀.
Hab. Tranquebar.

Gen. Elis, *Fabr.*

(Subgenus *Trielis*, Sauss. & Sich.)

Div. 1. The anterior wings with three submarginal cells and two recurrent nervures.

1. Elis (Scolia) litigiosa, *Smith, Cat. Hym. Ins.* iii. 113. 133, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 158. 164.
Hab. India.

2. E. (Scolia) erythrosoma, *Burm. Mon. Scol.* p. 15. 1; *Smith, Cat. Hym. Ins.* iii. 113. 134.
Hab. Sumatra.

3. E. (Scolia) fulva, *Gray, Cuv. Anim. Kingd.* (*Griffiths*), p. 516, pl. 71. fig. 1, ♀; *Smith, Cat., et Proc. Linn. Soc.* vi. 54. 9, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 159. 165.
Scolia ferruginea, *Fabr. Syst. Piez.* p. 241. 16, ♂?; *Smith, Cat. Hym. Ins.* iii. 114. 139; *Sauss. & Sich. Cat. Spec. Gen. Scol.* 159. 166.
Hab. Ceram; Australia.

(Subgenus *Dielis*, Sauss. & Sich.)

Div. 2. The anterior wings with two submarginal cells and two recurrent nervures.

4. Elis rubromaculata, *Smith, Cat. Hym. Ins.* iii. 99. 67; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 196. 209, ♀.
Hab. India.

5. E. (Colpa) parvula, *St.-Farg. Hym.* iii. 548. 17, ♀; *Smith, Cat. Hym. Ins.* iii. 99. 68.
Hab. India.

6. E. (Scolia) eximia, *Smith, Cat. Hym. Ins.* iii. 99. 69, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 195. 208.
Hab. India.

7. E. (Scolia) habrocoma, *Smith, Cat. Hym. Ins.* iii. 100. 71, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 198. 212.
Hab. India.

8. E. (Scolia) luctuosa, *Smith, Cat. Hym. Ins.* iii. 101. 78, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 194. 206.
E. quadriguttulata, *Sauss. Mél. Hym.* p. 58, fig. 12, ♀ (pl.).
Hab. Silhet.

9. E. (Scolia) aurulenta, *Smith, Cat. Hym. Ins.* iii. 102. 80, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 206. 221.
Hab. Philippine Islands.

20. ELIS (SCOLIA) MOROSA, *Smith, Proc. Linn. Soc.* vi. 53. 5, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 193. 204.
Hab. Ceram.

21. E. TRISTIS, *Sauss. Ent. Zeit.* 1859, p. 265 (*nec Burm.*); *Cat. Spec. Gen. Scol.* p. 193. 205, ♀.
Hab. Java; Borneo.

22. E. (SCOLIA) 4-GUTTULATA, *Burm. Mon. Scol.* p. 21. 17, ♀; *Smith, Cat. Hym. Ins.* iii. 100. 73; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 195. 207.
Hab. Java.

23. E. RUBROMACULATA, *Smith, Cat. Hym. Ins.* iii. 99. 67, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 196. 209.
Hab. India; Java.

24. E. (TIPHIA) ANNULATA, *Fabr. Syst. Piez.* p. 234. 11, ♀; *Burm. Mon. Scol.* p. 25. 27; *Smith. Cat. Hym. Ins.* iii. 100. 72; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 196. 210.
Hab. India; Java; China.

25. E. DREWSENI, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 197. 211, ♀.
Hab. Java.

26. E. SNELLENI, *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 198. 213, ♀.
Hab. Sumatra.

27. E. (TIPHIA) GROSSA, *Fabr. Syst. Piez.* p. 232. 4, ♀; *Burm. Mon. Scol.* p. 23. 22; *Smith, Cat. Hym. Ins.* iii. 99. 70; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 199. 215.
Elis sericea, *Sauss. Mél. Hym.* 63. 31, ♂.
Hab. India; Java.

28. E. HIRSUTA, *Sauss. Ann. Soc. Ent. Fr.* 1858, 234. 47, ♀; *Cat. Spec. Gen. Scol.* p. 200. 216.
Hab. Tranquebar.

29. E. (COLPA) IRIS, *St.-Farg. Hym.* iii. 547. 16, ♂; *Burm. Mon. Scol.* p. 26. 28, ♂, ♀; *Smith, Cat. Hym. Ins.* iii. 100. 75; *Sauss. & Sich. Cat. Spec. Gen. Scol.* p. 201. 217.
Elis phalerata, *Sauss. Ann. Soc. Ent. Fr.* 1858, 233. 45; *Ent. Zeit.* 1859, p. 268, ♀.
Hab. Java.

30. E. (CAMPSOMERIS) LINDENII, *St.-Farg. Hym.* iii. 500. 8, ♀; *Sauss. & Sich. Cat. Spec. Gen. Scol.* vi. p. 204. 219.

Fam. POMPILIDÆ, Leach.

Gen. POMPILUS, *Fabr.*

1. POMPILUS ANALIS, *Fabr. Syst. Piez.* p. 188. 4, ♀; *D* *Eur.* i. 47; *St.-Farg. Hym.* iii. 439. 35; *Smith, Proc. L* 119. 1.
Hab. India; Singapore; Java; Bachian; Celebes; Aru.

2. P. COMPTUS, *St.-Farg. Hym.* iii. 425. 13, ♀.
Hab. India.

3. P. (CALICURGUS) DORSALIS, *St.-Farg. Hym.* iii. 407. 1
Hab. Java.

4. P. FENESTRATUS, *Smith, Cat. Hym. Ins.* iii. 144. 128,
Hab. India (Bengal).

5. P. HONESTUS, *Smith, Cat. Hym. Ins.* iii. 144. 129, ♀.
Hab. India.

6. P. MADRASPATANUS, *Smith, Cat. Hym. Ins.* iii. 144. 13
Hab. India.

7. P. PEDUNCULATUS, *Smith, Cat. Hym. Ins.* iii. 145. 131,
Hab. India.

8. P. UNIFASCIATUS, *Smith, Cat. Hym. Ins.* iii. 145. 133,
Hab. India; Sumatra.

9. P. GRAPHICUS, *Smith, Cat. Hym. Ins.* iii. 148. 143, ♀.
Hab. Philippines.

10. P. LEUCOPHÆUS, *Smith, Proc. Linn. Soc.* ii. 92. 1, ♂
Hab. Malacca.

14. POMPILUS CONTORTUS, *Smith, Proc. Linn. Soc.* iii. 12. 3, ♀.
Hab. Celebes.

15. P. PILIFRONS, *Smith, Proc. Linn. Soc.* iii. 12. 4, ♀.
Hab. Celebes; Flores.

16. P. DECEPTOR, *Smith, Proc. Linn. Soc.* iii. 12. 5, ♂.
Hab. Celebes.

17. P. DUBIUS, *Smith, Proc. Linn. Soc.* iii. 153. 1, ♀.
Hab. Aru.

18. P. CONFORMIS, *Smith, Proc. Linn. Soc.* v. 78. 1, ♀.
Hab. Celebes.

19. P. LIMBATUS, *Smith, Proc. Linn. Soc.* v. 78. 2, ♂.
Hab. Celebes.

20. P. NIGRO-CÆRULEUS, *Smith, Proc. Linn. Soc.* v. 79. 3, ♀.
Hab. Celebes.

21. P. INCERTUS, *Smith, Proc. Linn. Soc.* v. 79. 4, ♂.
Hab. Celebes.

22. P. DEPREDATOR, *Smith, Proc. Linn. Soc.* v. 119. 3, ♀.
Hab. Bachian.

23. P. PELETERII, *Guér. Voy. Coq. Zool.* ii. 257, pl. 9. fig. 2.
Hab. Amboyna.

24. P. FULGIDIPENNIS, *Smith, Proc. Linn. Soc.* v. 119. 4, ♀.
Hab. Bachian.

25. P. OPULENTUS, *Smith, Proc. Linn. Soc.* v. 120. 5, ♀.
Hab. Bachian.

26. P. PRÆDATOR, *Smith, Proc. Linn. Soc.* vi. 54. 1, ♀.
Hab. Menado.

27. P. RUFIFRONS, *Smith, Proc. Linn. Soc.* vi. 54. 2, ♀.
Hab. Ternate.

28. P. BICOLOR, *Fabr. Syst. Piez.* p. 198. 56, ♀.
Hab. Ceram; Australia.

29. P. JUCUNDUS, *Smith, Proc. Linn. Soc.* vii. 29. 3, ♀.
Hab. Mysol.

30. P. VIGILANS, *Smith, Proc. Linn. Soc.* vii. 29. 4, ♀.
Hab. Waigiou.

31. P. COGNATUS, *Smith, Proc. Linn. Soc.* viii. 82. 4, ♂.
Hab. Morty Island.

32. P. ELATUS, *Smith, Proc. Linn. Soc.* viii. 82. 5, ♀.
Hab. Morty Island.

10. P. RUFIFRONS, *Smith, Proc. Linn. Soc.* iii. 12. 1, ♀.
Hab. Celebes.

11. P. PULCHERRIMUS, *Smith, Proc. Linn. Soc.* iii. 156. 1, ♀.
Hab. Aru; Mysol; Salwatty.

12. P. FERVIDUS, *Smith, Proc. Linn. Soc.* iii. 156. 2, ♀.
Hab. Aru; New Guinea; Ceram; Mysol.

13. P. FLAVIPENNIS, *Smith, Proc. Linn. Soc.* v. 79. 1, ♀.
Hab. Celebes; Bachian; Ceram; New Guinea.

14. P. CONFECTOR, *Smith, Proc. Linn. Soc.* v. 120. 3, ♀.
Hab. Bachian; Ternate.

15. P. ADUSTUS, *Smith, Proc. Linn. Soc.* vii. 30. 4, ♂.
Hab. Mysol.

Gen. AGENIA, *Schiödte.*

1. AGENIA (POMPILUS) BLANDA, *Guér. Voy. Coq.* ii. 260, ♀; *Smith, Proc. Linn. Soc.* ii. 94. 7.
Hab. India; Malacca; Borneo; Celebes; Ceram; Key; Flores.

2. A. (POMPILUS) TINCTA, *Smith, Cat. Hym. Ins.* iii. 145. 152, ♀.
Hab. India.

3. Agenia (Pompilus) cærulea, *Smith, Cat. Hym. Ins.* iii. 147. 141, ♀.
Hab. India.

4. A. varipes, *Dahlb. Hym. Eur.* i. 455. 7, ♀.
Hab. Java.

5. A. Atalanta, *Smith, Proc. Linn. Soc.* ii. 94. 8, ♂.
Hab. Borneo; Singapore; Malacca; Bachian; Celebes.

6. A. Ægina, *Smith, Proc. Linn. Soc.* ii. 94. 9, ♀.
Hab. Borneo.

7. A. Daphne, *Smith, Proc. Linn. Soc.* ii. 95. 10, ♀.
Hab. Borneo.

8. A. Laverna, *Smith, Proc. Linn. Soc.* ii. 95. 11, ♂.
Hab. Borneo.

9. A. Melampus, *Smith, Proc. Linn. Soc.* ii. 95. 12, ♂.
Hab. Borneo.

10. A. flavo-picta, *Smith, Proc. Linn. Soc.* ii. 96. 13, ♀.
Hab. Singapore.

11. A. Hippolyte, *Smith, Proc. Linn. Soc.* ii. 96. 14, ♀.
Hab. Singapore.

12. A. Celæno, *Smith, Proc. Linn. Soc.* ii. 96. 15, ♀.
Hab. Singapore.

13. A. bimaculata, *Smith, Proc. Linn. Soc.* iii. 13. 2, ♀.
Hab. Celebes.

14. A. Callisto, *Smith, Proc. Linn. Soc.* iii. 154, 2, ♀.
Hab. Aru.

15. A. jucunda, *Smith, Proc. Linn. Soc.* iii. 154. 3, ♀.
Hab. Aru.

16. A. Althea, *Smith, Proc. Linn. Soc.* iii. 154. 4, ♀.
Hab. Aru.

17. A. Alcyone, *Smith, Proc. Linn. Soc.* iii. 155. 5, ♂.
Hab. Aru.

18. A. Amalthea, *Smith, Proc. Linn. Soc.* iii. 155. 6, ♀.
Hab. Aru; Salwatty.

19. A. honesta, *Smith, Proc. Linn. Soc.* v. 80. 2, ♀.
Hab. Celebes.

20. A. assimilis, *Smith, Proc. Linn. Soc.* v. 80. 3, ♀.
Hab. Celebes.

21. A. nitidiventris, *Smith, Proc. Linn. Soc.* v. 80. 4, ♀.
Hab. Celebes.

3. MACROMERIS IRIDIPENNIS, *Smith, Proc. Linn. Soc.* iv. 156. 1, ♂, ♀.
Hab. Aru.

Gen. SALIUS, *Fabr.*

1. SALIUS MALIGNUS, *Smith, Proc. Linn. Soc.* iv. 157. 1.
Hab. Aru; Mysol.

Gen. MYGNIMIA, *Shuck.*

1. MYGNIMIA (SPHEX) FLAVA, *Drury, Ill. Exot. Ins.* iii. tab. 42. fig. 4, ♀; *Smith, Cat. Hym. Ins.* iii. 182. 2; *Proc. Linn. Soc.* ii. 1.
Pompilus flavus, *Fabr. Syst. Piez.* p. 197. 52; *St.-Farg. Hym.* iii. 430. 21.
Hemipepsis flavus, *Dahlb. Hym. Eur.* i. 123.
Hab. India; Borneo; Singapore; Gilolo; Sumatra.

2. M. AUREOSERICEA, *Guér. Voy. Coq.* ii. 256, ♀; *Smith, Cat. Hym. Ins.* iii. 182. 3.
Hab. Java.

3. M. AUDAX, *Smith, Cat. Hym. Ins.* iii. 182. 4, ♀.
Hab. Silhet.

4. M. ANTHRACINA, *Smith, Cat. Hym. Ins.* iii. 183. 5, ♂.
Hab. Malacca; Borneo; Singapore; Sumatra.

5. M. ALBIPLAGIATA, *Smith, Cat. Hym. Ins.* iii. 183. 6, ♀.
Hab. Java.

6. M. ÆRUGINOSA, *Smith, Cat. Hym. Ins.* iii. 184. 8, ♀.
Hab. Sumatra.

7. M. FENESTRATA, *Smith, Cat. Hym. Ins.* iii. 184. 10, ♂.
Hab. Silhet.

8. M. PERPLEXA, *Smith, Cat. Hym. Ins.* iii. 185. 11, ♀.
Hab. Madras.

9. M. (PEPSIS) FLAVICORNIS, *Fabr. Syst, Piez.* p. 216. 44.
Hab. Malabar.

10. M. DUCALIS, *Smith, Proc. Linn. Soc.* ii. 98. 3, ♀.
Hab. Malacca; Sumatra.

11. M. PRINCEPS, *Smith, Proc. Linn. Soc.* ii. 98, 4, ♀.
Hab. Borneo.

12. M. IRIDIPENNIS, *Smith, Proc. Linn. Soc.* ii. 98. 5, ♀.
Hab. Malacca; Borneo; Ceram; Timor.

13. M. FUMIPENNIS, *Smith, Proc. Linn. Soc.* iii. 13. 2, ♀.
Hab. Celebes.

Hab. New Guinea.

18. M. LACÆNA, *Smith, Proc. Linn. Soc.* v. 121. 4, ♀.
Hab. Amboyna; Sumatra.

19. M. THIONE, *Smith, Proc. Linn. Soc.* v. 121. 5, ♀.
Hab. Amboyna.

20. M. COGNATA, *Smith, Proc. Linn. Soc.* vi. 55. 3, ♀.
Hab. Ternate.

21. M. INTREPIDA, *Smith, Proc. Linn. Soc.* vii. 32. 4, ♀.
Hab. Timor.

22. M. OPULENTA, *Smith, Proc. Linn. Soc.* vii. 32. 5, ♂.
Hab. Mysol.

23. M. EXASPERATA, *Smith, Proc. Linn. Soc.* vii. 32. 6. ♀
Hab. Mysol.

Gen. CEROPALES, *Latr.*

1. CEROPALES FLAVO-PICTA, *Smith, Cat. Hym. Ins.* iii. 1
Hab. India.

2. C. FUSCIPENNIS, *Smith, Cat. Hym. Ins.* iii. 179. 6, ♀.
Hab. India.

3. C. ORNATA, *Smith, Cat. Hym. Ins.* iii. 179. 7, ♀.
Hab. India.

Gen. PEPSIS, *Fabr.*

1. PEPSIS DISELENE, *Smith, Cat. Hym. Ins.* iii. 200. 51,
Hab. India; Singapore.

Gen. AMMOPHILA, *Kirby*.

3. AMMOPHILA NIGRIPES, *Smith, Cat. Hym. Ins.* iv. 215. 38, ♂.
Hab. Madras; Floris.

4. A. LÆVIGATA, *Smith, Cat. Hym. Ins.* iv. 215. 39.
Hab. Madras; Guzerat.

5. A. DIMIDIATA, *Smith, Cat. Hym. Ins.* iv. 216, 40, ♀.
Hab. Bombay; Madras; Bengal.

6. A. ELEGANS, *Smith, Cat. Hym. Ins.* iv. 216. 42, ♂, ♀.
Hab. North India: Punjaub.

7. A. ATRIPES, *Smith, Ann. & Mag. Nat. Hist.* (1852) ix. 46.
Hab. India; Khandala; Sumatra; China.

8. A. SMITHII, *Baly, MSS.*; *Smith, Cat. Cat. Hym. Ins.* iv. 217. 45, ♀.
Hab. India.

9. A. VAGABUNDA, *Smith, Cat. Hym. Ins.* iv. 218. 47, ♀.
Hab. North India; Sumatra; North China.

10. A. INSOLATA, *Smith, Proc. Linn. Soc.* iii. 14. 2, ♂, ♀.
Hab. Celebes.

Gen. PELOPŒUS, *Latr.*

1. PELOPŒUS MADRASPATANUS, *Fabr. Syst. Piez.* p. 203. 3; *Dahlb. Hym. Europ.* i. 22. 3; *Smith, Cat. Hym. Ins.* iv. 231. 17.
Hab. Malabar; Madras; Nepaul; Bengal.

2. P. SOLIERI, *St.-Farg. Hym.* iii. 318. 18, ♀.
Hab. India.

3. P. SPINOLÆ, *St.-Farg. Hym.* iii. 307. 4, ♀.
Hab. Bombay; Ceylon.

4. P. COROMANDELICUS, *St.-Farg. Hym.* iii. 306. 2, ♀.
P. fuscus, *St.-Farg. Hym.* iii, 311. 9, ♀, var.?
Hab. Coromandel; Central India.

5. P. PICTUS, *Smith, Cat. Hym. Ins.* iv. 231. 22, ♂.
Hab. India.

6. P. RUFOPICTUS, *Smith, Cat. Hym. Ins.* iv. 232. 23, ♀.
Hab. Celebes.

7. P. LÆTUS, *Smith, Cat. Hym. Ins.* iv. 229. 13, pl. vii. fig. 1, ♀.
Hab. Ceram; Gilolo; Ternate; Australia.

8. P. BENIGNUS, *Smith, Proc. Linn. Soc.* ii. 101. 1, *nec* P. javanus, and vol. iii. 15, *note*.
Hab. Borneo; Singapore; Java.

12. P. LABORIOSUS, *Smith, Proc. Linn. Soc.* iii. 159. 1
Hab. Aru; Flores.

13. P. FABRICATOR, *Smith, Proc. Linn. Soc.* v. 123. 3,
Hab. Bachian.

14. P. UNIFASCIATUS, *Smith. Proc. Linn. Soc.* v. 123.
Hab. Bachian.

15. P. SPIRIFEX, *Linn. Syst. Nat.* i. 942. 9.
Hab. Timor; Africa; Europe.

16. P. MURARIUS, *Smith, Proc. Linn. Soc.* vii. 34. 4, ♀
Hab. Ceram; New Guinea.

17. P. BILINEATUS, *Smith, Ann. & Mag. Nat. Hist.* (18
Hab. India (Bombay).

18. P. SEPARATUS, *Smith, Ann. & Mag. Nat. Hist.* (18
Hab. India (Bombay).

19. P. BENGALENSIS, *Dahlb. Hym. Eur.* i. 433. 2; *Sm*
Ins. iv. 230. 15.
Hab. India; Floris; Philippines; China; Mauritius.

20. P. JAVANUS, *St.-Farg. Hym.* iii. 309. 6; *Smith,* C
iv. 231. 16.
Hab. Java; Malacca.

Gen. CHALYBION, *Dahlb.*

2. CHLORION SPLENDIDUM, *Fabr. Syst. Piez.* p. 218. 5; *Smith, Ann. & Mag. Nat. Hist.* (1851), vii. 32.
Pronœus Campbelli, *Saund. Trans. Ent. Soc. Lond.* iii. 58, tab. v. fig. 1, ♀.
Sphex pulchra, *St.-Farg. Hym.* iii. 355. 31, ♂.
Hab. North India.

3. C. MELASOMA, *Smith, Cat. Hym. Ins.* iv. 238. 5, ♀.
Hab. India (Pondicherry).

4. C. RUGOSUM, *Smith, Cat. Hym. Ins.* iv. 239. 6, ♂.
Hab. Sumatra.

Gen. SPHEX, *Fabr.*

1. SPHEX ARGENTATA, *Dahlb. Hym. Eur.* i. 25. 1, ♂, ♀.
P. albifrons; *St.-Farg. Hym.* iii. 337. 6, ♂.
P. argentifrons, *St.-Farg. Hym.* iii. 337. 7, ♀.
Hab. Bengal; Madras; Punjaub; Sumatra; Java; New Guinea; Celebes; Ceram; Aru; Morty Island; Africa.

2. S. VICINA, *St.-Farg. Hym.* iii. 343. 16, ♀.
Hab. India.

3. S. FABRICII, *Dahlb. Hym. Eur.* i. 27. 11, & 438. 21, ♀.
Hab. India (Tranquebar).

4. S. FERRUGINEA, *St.-Farg. Hym.* iii. 345. 18, ♀.
Hab. India; Ceylon; Philippines; Salwatty.

5. S. FLAVO-VESTITA, *Smith, Cat. Hym. Ins.* iv. 253. 56, ♂.
Hab. India.

6. S. APICALIS, *Smith, Cat. Hym. Ins.* iv. 253. 57, ♀.
Hab. Sumatra.

7. S. LINEOLA, *St.-Farg. Hym.* iii. 253. 27, ♂.
Hab. Java; Sumatra; North China.

8. S. NIGRIPES, *Smith, Cat. Hym. Ins.* iv. 254. 59, ♀.
Hab. Sumatra; North China; India; Singapore; Gilolo; Celebes.

9. S. FORMOSA, *Smith, Cat. Hym. Ins.* iv. 254. 60, ♀.
Hab. Ceram.

10. S. MAURA, *Smith, Cat. Hym. Ins.* iv. 255. 61, ♀.
Hab. Celebes.

11. S. (PEPSIS) SERICEA, *Fabr. Syst. Piez.* 211. 19; *Dahlb. Hym. Europ.* i. 126. 7; *St.-Farg. Hym.* iii. 341. 12.
Hab. Java; Malacca; Borneo; Philippines; Ternate; Waigiou; Bachian; Ceram; Aru; Timor; Sumatra; Floris.

12. S. DIABOLICUS, *Smith, Proc. Linn. Soc.* ii. 100. 3. ♀.
Hab. Borneo; Bachian; Ceram; Amboyna; New Guinea.

Hab. Aru.

16. S. sepicola, *Smith, Proc. Linn. Soc.* iii. 158. 5, ♀.
Hab. Aru.

17. S. gratiosa, *Smith, Proc. Linn. Soc.* iii. 158. 6, ♂.
Hab. Aru.

18. S. tyrannica, *Smith, Proc. Linn. Soc.* v. 122. 5, ♀.
Hab. Bachian; Kaioa; Gilolo; Timor; Sula.

19. S. jaculator, *Smith, Proc. Linn. Soc.* v. 122. 6, ♂.
Hab. Bachian.

20. S. morosa, *Smith, Proc. Linn. Soc.* v. 122. 7, ♂.
Hab. Bachian.

21. S. volatilis, *Smith, Proc. Linn. Soc.* v. 122. 8, ♂.
Hab. Bachian.

22. S. ferox, *Smith, Proc. Linn. Soc.* vi. 55. 5, ♂.
Hab. Amboyna; Celebes; Waigiou; Floris.

Gen. Harpactopus, *Smith.*

1. Harpactopus crudelis, *Smith, Cat. Hym. Ins.* iv. 26 fig. 4, ♀.
Hab. Madras.

2. H. nivosus, *Smith, Cat. Hym. Ins.* iv. 265. 4, ♀.
Hab. North India.

Gen. Parasphex, *Smith.*

1. Parasphex fervens, *Smith, Cat. Hym. Ins.* iv. 267. 1.
Pepsis fervens, *Fabr. Syst. Piez.* p. 209. 6.

Gen. Ampulex, *Jur.*

1. Ampulex (Sphex) compressa, *Fabr. Ent. Syst.* ii. 206. 32; *Jurine, Hym.* p. 134; *St.-Farg. Encycl. Méth.* x. 450; *Hym.* iii. 325. 1; *Dahlb. Hym. Eur.* i. 29. 1.
Chlorion compressum, *Fabr. Syst. Piez.* p. 219. 7; *Latr. Hist. Crust. et Ins.* xiii. 294; *Westw. Trans. Ent. Soc. Lond.* (1843), iii. 227; *Cuv. Règ. Anim. Atlas, Ins.* pl. 120 bis, fig. 3.
Guêpe Ichneumon, *Réaum. Ins.* vi. 280, tab. 28. figs. 2, 3.
Hab. India; China; Malacca; Borneo; Singapore; Sumatra; Java; Celebes; Amboyna.

2. A. cuprea, *Smith, Cat. Hym. Ins.* iv. 269. 3, ♂.
Hab. China (Hongkong).

3. A. hospes, *Smith, Cat. Hym. Ins.* iv. 272. 12; *Proc. Linn. Soc.* ii. 98. 1, ♀.
Hab. Borneo.

4. A. smaragdina, *Smith, Proc. Linn. Soc.* ii. 19. 3, ♀.
Hab. Singapore.

5. A. insularis, *Smith, Proc. Linn. Soc.* ii. 99. 4, ♀.
Hab. Borneo; Malacca.

6. A. regalis, *Smith, Proc. Linn. Soc.* v. 83. 1, ♀.
Hab. Celebes.

Gen. Trirogma, *Westw.*

1. Trirogma cærulea, *Westw. Trans. Ent. Soc. Lond.* iii. 225, tab. 12. fig. 3, ♂; *Archiv. Ent.* ii. 66, tab. 65. fig. 4, ♀.
Hab. N. India; Madras; Singapore; Celebes.

2. T. prismatica, *Smith, Proc. Linn. Soc.* ii. 99. 2, ♂.
Hab. Borneo.

Fam. LARRIDÆ, Steph.

Gen. Larrada, *Smith.*

1. Larrada (Sphex) aurulenta, *Fabr. Mant.* i. 274. 10.
Sphex aurata, *Fabr. Ent. Syst.* ii. 213. 64.
Pompilus auratus, *Fabr. Ent. Syst. Supp.* 250. 25.
Liris aurata, *Fabr. Syst. Piez.* p. 228. 3; *Dahlb. Hym. Eur.* i. 135.
Tachytes opulenta, *St.-Farg. Hym.* iii. 246. 7.
Lyrops aurata, *Guér. Icon. Règ. Anim.* iii. 440.
Larrada aurulenta, *Smith, Cat. Hym. Ins.* iv. 276. 6, pl. vii. fig. 5.
Hab. India; China; Philippines; Borneo; Sumatra; Java; Bachian; Celebes; Bouru; Africa (Cape of Good Hope and Gambia).

11. L. JACULATOR, *Smith, Cat. Hym. Ins.* iv. 279. 15, ♀.
Hab. N. Bengal.

12. L. CARBONARIA, *Smith, Proc. Linn. Soc.* ii. 102. 2, ♀.
Hab. Singapore.

13. L. SYCORAX, *Smith, Proc. Linn. Soc.* ii. 102. 3, ♀.
Hab. Borneo.

14. L. POLITA, *Smith, Proc. Linn. Soc.* ii. 102. 4, ♀.
Hab. Borneo.

15. L. TISIPHONE, *Smith, Proc. Linn. Soc.* ii. 103. 5, ♀.
Hab. Borneo.

16. L. ALECTO, *Smith, Proc. Linn. Soc.* ii. 103. 6, ♀.
Hab. Singapore.

17. L. ÆDILIS, *Smith, Proc. Linn. Soc.* iii. 16. 3, ♀.
Hab. Celebes.

18. L. AUFRIFRONS, *Smith, Proc. Linn. Soc.* iii. 16. 4, ♂.
Hab. Celebes.

19. L. PERSONATA, *Smith, Proc. Linn. Soc.* iii. 16. 5, ♀.
Hab. Celebes.

20. Larrada rufipes, *Smith, Proc. Linn. Soc.* iii. 17. 6, ♂, ♀.
Hab. Celebes.

21. L. festinans, *Smith, Proc. Linn. Soc.* iii. 17. 7, ♂, ♀.
Hab. Celebes.

22. L. modesta, *Smith, Proc. Linn. Soc.* iii. 159. 1, ♀.
Hab. Aru; Key; Waigiou.

23. L. ducalis, *Smith, Proc. Linn. Soc.* v. 84. 1, ♀.
Hab. Celebes.

24. L. vindex, *Smith, Proc. Linn. Soc.* v. 123. 3, ♀.
Hab. Bachian.

25. L. tarsata, *Smith, Proc. Linn. Soc.* v. 124. 4, ♀.
Hab. Bachian.

26. L. chrysobapta, *Smith, Proc. Linn. Soc.* vi. 56. 1, ♀.
Hab. Celebes.

27. L. funerea, *Smith, Proc. Linn. Soc.* vii. 34. 3, ♀.
Hab. Waigiou.

28. L. sabulosa, *Smith, Proc. Linn. Soc.* vii. 35. 4, ♀.
Hab. Ceram.

29. L. mansueta, *Smith, Proc. Linn. Soc.* viii. 84. 2, ♀.
Hab. New Guinea.

30. L. mendax, *Smith, Proc. Linn. Soc.* viii. 84. 3, ♀.
Hab. Gilolo.

Gen. Morphota, *Smith.*

1. Morphota formosa, *Smith, Proc. Linn. Soc.* iii. 17. 1, ♀.
Hab. Waigiou; Celebes.

Gen. Tachytes, *Panz.*

1. Tachytes tarsatus, *Smith, Cat. Hym. Ins.* iv. 297. 10, ♀.
Hab. India.

2. T. fervidus, *Smith, Cat. Hym. Ins.* iv. 298. 11, ♀.
Hab. India.

3. T. (Crabro) nitidulus, *Fabr. Syst. Piez.* p. 298. 12.
Hab. India; Malacca; Sumatra; Celebes.

4. T. monetarius, *Smith, Cat. Hym. Ins.* iv. 298. 13, ♀.
Hab. N. India.

5. T. modestus, *Smith, Cat. Hym. Ins.* iv. 299. 14, ♀.
Hab. India.

4. BEMBEX MELANCHOLICA, *Smith, Cat. Hym. Ins.* iv. 328. 47, ♀.
Hab. Sumatra; China; Borneo; Singapore; Bachian; Celebes; Aru; Salwatty; Morty Island.

Fam. NYSSONIDÆ, Wesm.

Gen. LARRA, *Klug.*

1. LARRA DELESSERTII, *Guér. Icon. Règ.-Anim.* iii. 439.
Hab. India (Pondicherry).

2. L. VESPIFORMIS, *Fabr. Syst. Piez.* p. 219. 1.
Stizus vespiformis, *Dahlb. Hym. Eur.* i. 154; *St.-Farg. Hym.* iii. 297. 6.
Hab. India (Madras, N. India).

3. L. BLANDINA, *Smith, Cat. Hym. Ins.* iv. 340. 12, ♂, ♀.
Hab. India.

4. L. FASCIATA, *Fabr. Syst. Piez.* p. 221. 13; *Klug, Symb. Phys.* tab. 46. fig. 14.
Stizus fasciatus, *Dahlb. Hym. Eur.* i. 153.
Hab. Tranquebar; N. India; Ethiopia (Ambukol).

5. L. MELANOXANTHA, *Smith, Cat. Hym. Ins.* iv. 346. 37, ♂.
Hab. India.

6. L. MELLEA, *Smith, Cat. Hym. Ins.* iv. 344. 38, ♀.
Hab. India.

7. L. NUBILIPENNIS, *Smith, Cat. Hym. Ins.* iv. 347. 41, ♀.
Hab. India.

8. L. REVERSA, *Smith, Cat. Hym. Ins.* iv. 349. 47, ♀.
Hab. Sumatra.

9. L. RUFESCENS, *Smith, Cat. Hym. Ins.* iv. 349. 48, ♀.
Hab. India (Punjaub).

10. L. PRISMATICA, *Smith, Proc. Linn. Soc.* ii. 103. 1, ♂, ♀.
Hab. Borneo; Malacca; Celebes.

11. L. SIMILLIMA, *Smith, Proc. Linn. Soc.* iii. 159. 1, ♀.
Hab. Aru.

12. L. MODESTA, *Smith, Proc. Linn. Soc.* v. 124. 1, ♀.
Hab. Bachian.

Gen. MYSSON, *Latr.*

1. MYSSON BASALIS, *Smith, Cat. Hym. Ins.* iv. 355. 11, ♂.
Hab. India.

Gen. GORYTES, *Latr.*

1. GORYTES ORNATUS, *Smith, Cat. Hym. Ins.* iv. 371. 5, ♀.
Hab. India.

2. OXYBELUS TRIDENTATUS, *Smith, Cat. Hym. Ins.* iv. 387. 26, ♂.
Hab. India.

3. O. RUFICORNIS, *Smith, Cat. Hym. Ins.* iv. 388. 27, ♀.
Hab. India.

4. O. SABULOSUS, *Smith, Cat. Hym. Ins.* iv. 388. 28, ♀.
Hab. India.

Gen. CRABRO, *Fabr.*

Div. 1. Abdomen petiolated.

1. CRABRO FLAVO-PICTUS, *Smith, Cat. Hym. Ins.* iv. 391. 4, ♀.
Hab. North India.

2. C. AGILIS, *Smith, Proc. Linn. Soc.* iii. 18. 1, ♀.
Hab. Celebes.

Div. 2. Abdomen sessile.

3. C. FUSCIPENNIS, *St.-Farg. Ann. Soc. Ent. Fr.* iii. 710. 11; *Hym.* iii. 113. 11; *Dahlb. Hym. Europ.* i. 385. 255.
Hab. India.

4. C. INSIGNIS, *Smith, Cat. Hym. Ins.* iv. 422. 145, ♀.
Hab. India.

5. C. ARGENTATUS, *St.-Farg. Ann. Soc. Ent. Fr.* iii. 792. 1; *Hym.* iii. 194. 1 (Lindenius); *Dahlb. Hym. Europ.* i. 300. 182.
Hab. India.

6. C. FAMILIARIS, *Smith, Proc. Linn. Soc.* ii. 106. 1, ♂.
Hab. Borneo.

7. C. RUGOSUS, *Smith, Proc. Linn. Soc.* ii. 106. 2, ♂.
Hab. Borneo.

Gen. ARPACTOPHILUS, *Smith.*

1. ARPACTOPHILUS BICOLOR, *Smith, Proc. Linn. Soc.* vii. 31. 6, ♀.
Hab. Mysol.

Gen. PSEN, *Latr.*

1. PSEN ERRATICUS, *Smith, Proc. Linn. Soc.* v. 85. 1, ♀.
Hab. Celebes.

2. P. PETIOLATUS, *Smith, Proc. Linn. Soc.* vii. 37. 1, ♀.
Hab. Mysol.

Fam. CERCERIDÆ, Wesm.

Gen. CERCERIS, *Latr.*

1. CERCERIS BIFASCIATUS, *Guér. Icon. Règ. Anim.* 443, tab. 71. fig. 9.
Hab. Bengal.

Hab. North India.

6. C. INSTABILIS, *Smith, Cat. Hym. Ins.* iv. 452. 74, ♀.
Hab. India; Celebes; China.

7. C. MASTOGASTER, *Smith, Cat. Hym. Ins.* iv. 453. 75, ♀.
Hab. Madras.

8. C. ORIENTALIS, *Smith, Cat. Hym. Ins.* iv. 454. 76, ♀.
Hab. Madras.

9. C. VIGILANS, *Smith, Cat. Hym. Ins.* iv. 454. 77, ♂.
Hab. Madras.

10. C. FULIGINOSA, *Smith, Cat. Hym. Ins.* iv. 454. 79, ♀.
Hab. Celebes.

11. C. FEROX, *Smith, Cat. Hym. Ins.* iv. 454. 80, ♀.
Hab. Sumatra.

12. C. SEPULCRALIS, *Smith, Proc. Linn. Soc.* ii. 107. 1, ♀.
Hab. Borneo; Sumatra.

13. C. UNIFASCIATA, *Smith, Cat. Hym. Ins.* iv. 456. 79; *P Soc.* iii. 19. 2.
Hab. Celebes; China.

14. C. VARIPES, *Smith, Cat. Hym. Ins.* iv. 19. 4, ♂.
Hab. Celebes.

15. C. PRÆDATA, *Smith, Proc. Linn. Soc.* v. 126. 1, ♀.
Hab. Bachian.

16. C. IMMOLATOR, *Smith, Proc. Linn. Soc.* vii. 37. 1, ♀.
Hab. Waigiou.

17. C. TUMULORUM, *Smith, Proc. Linn. Soc.* viii. 67. 2, ♀.
Hab. Gilolo.

4. PHILANTHUS DEPRÆDATOR, *Smith, Cat. Hym. Ins.* iv. 470. 7, ♂.
Hab. India.

5. P. BASALIS, *Smith, Cat. Hym. Ins.* iv. 473. 17, ♀.
Hab. Ceylon.

Tribe Diploptera.

Fam. EUMENIDÆ, Westw.

Gen. ZETHUS, *Fabr.*

1. ZETHUS CYANOPTERUS, *Sauss. Mon. Guêpes Sol. Supp.* p. 115; *Smith, Cat. Vespidæ*, v. 9. 1; *Proc. Linn. Soc.* iii. 19. 1.
Hab. Java.

Gen. GAYELLA, *Sauss.*

1. GAYELLA PULCHELLA, *Smith, Proc. Linn. Soc.* ii. 108. 1, ♀.
Hab. Borneo.

Gen. EUMENES, *Latr.*

1. EUMENES AFFINISSIMA, *Sauss. Mon. Guêpes Sol.* 37. 9, ♂; *Smith, Cat. Vespidæ*, v. 21. 12.
Hab. India.

2. E. XANTHURA, *Sauss. Mon. Guêpes Sol.* 46. 26, t. 10. f. 4, ♀; *Smith, Cat. Vesp.* v. 21. 13.
Hab. India.

3. E. CIRCINALIS, *Fabr. Syst. Piez.* p. 286. 4; *Sauss. Mon. Guêpes Sol.* 47. 27, t. 10. f. 7; *Smith, Cat. Vesp.* v. 22. 14.
Hab. India; Gilolo; Sumatra; Java; New Guinea; Celebes; Bouru; Kaisaa; Australia.

4. E. CONICA, *Fabr. Syst. Piez.* p. 285. 2; *Sauss. Mon. Guêpes Sol.* 52. 34; *Smith, Cat. Vesp.* 22. 15.
Hab. India; Philippines; China.

5. E. ESURIENS, *Fabr. Syst. Piez.* p. 286. 7; *Sauss. Mon. Guêpes Sol.* 56. 40; *Smith, Cat. Vesp.* v. 22. 16.
E. gracilis, *Sauss. Mon. Guêpes Sol.* 57. 41?
E. campaniformis, *Sauss. Mon. Guêpes Sol.* 55. 38.
Hab. India; Singapore; Mysol; New Guinea; China; Africa; Persia; Australia.

6. E. EDWARDSI, *Sauss. Mon. Guêpes Sol.* 60. 45, t. 11. f. 4, ♀; *Smith, Cat. Vesp.* v. 22. 17.
Hab. India.

7. E. FLAVO-PICTA, *Blanch. Dict. d'Hist. Nat. Hym.* ii. t. 11. f. 2, ♀; *Sauss. Mon. Guêpes Sol.* 65. 52, ♀; *Smith, Cat. Vesp.* v. 22. 18.
E. arcuata, *Westw. Ins. Ind.* 90, t. 57. f. 3.
Hab. India.

Hab. India; Malacca.

15. E. SUBLÆVIS, *Smith, Cat. Vesp.* 23. 25, ♀.
Hab. Borneo.

16. E. FULVIPENNIS, *Smith, Cat. Vesp.* 24. 26, ♀.
Hab. Celebes.

17. E. MELANOSOMA, *Sauss. Mon. Guêpes Sol.* 61. 46, t. 12. f. 1, ♀; *Smith, Cat. Vesp.* 25. 32.
Hab. Java.

18. E. CURVATA, *Sauss. Mon. Guêpes Sol. Supp.* 145. 32, t. 8. f. 1; *Smith, Cat. Vesp.* v. 25. 33.
Hab. Philippines.

19. E. PYRIFORMIS, *Sauss. Mon. Guêpes Sol.* 15. 12, t. 8. f. 8, ♀.
Hab. Java; Sumatra.

20. E. INCONSPICUA, *Smith, Proc. Linn. Soc.* ii. 109. 7, ♀.
Hab. Borneo.

21. E. SINGULARIS, *Smith, Proc. Linn. Soc.* ii. 109. 8, ♀.
Hab. Borneo.

22. Eumenes vindex, *Smith, Proc. Linn. Soc.* iii. 20. 3, ♂.
Hab. Celebes.

23. E. architectus, *Smith, Proc. Linn. Soc.* iii. 20. 4, ♀.
Hab. Celebes.

24. E. floralis, *Smith, Proc. Linn. Soc.* iii. 20. 5, ♂.
Hab. Celebes.

25. E. pictifrons, *Smith, Proc. Linn. Soc.* v. 86. 2, ♀.
Hab. Celebes.

26. E. artifex, *Smith, Proc. Linn. Soc.* v. 86. 3, ♀.
Hab. Celebes.

27. E. laboriosus, *Smith, Proc. Linn. Soc.* v. 87. 4, ♀.
Hab. Celebes.

28. E. tricolor, *Smith, Proc. Linn. Soc.* v. 87. 5, ♀.
Hab. Celebes; Gilolo; Bachian; Ceram.

29. E. medianus, *Smith, Proc. Linn. Soc.* vii. 38. 7, ♂.
Hab. Ceram.

30. E. conformis, *Smith, Proc. Linn. Soc.* vii. 38. 8, ♀.
Hab. Ceram.

31. E. volatilis, *Smith, Proc. Linn. Soc.* vii. 38. 9, ♀.
Hab. Mysol.

32. E. pullatus, *Smith, Proc. Linn. Soc.* vii. 39. 10, ♀.
Hab. Ceram.

33. E. perplexus, *Smith, Proc. Linn. Soc.* vii. 39. 11, ♀.
Hab. Bouru.

34. E. diligens, *Smith, Proc. Linn. Soc.* vii. 39. 12.
Hab. Bouru.

35. E. insolens, *Smith, Proc. Linn. Soc.* viii. 88. 7, ♀.
Hab. Gilolo.

36. E. quadrata, *Smith, Trans. Ent. Soc. Lond.* new ser. ii. 36, ♀; *Proc. Linn. Soc.* ii. 109. 6.
Hab. Borneo; China.

37. E. praslina, *Guér. Voy. Coq.* ii. 267, pl. 9. fig. 7, ♀ (arcuatus var.?); *Smith, Proc. Linn. Soc.* v. 126. 3; *Cat. Vesp.* v. 29. 61; *Sauss. Mon. Guêpes Sol.* 64. 51.
Hab. New Ireland (Port Praslin); Gilolo; Kaisaa; Key; Amboyna; Ternate.

38. E. tinctor, *Christ, Hym.* 341, t. 31. f. 1, ♀; *Sauss. Mon. Guêpes Sol.* 49. 30; *Smith, Proc. Linn. Soc.* vi. 57. 1.
Hab. Gilolo; Senegal; Congo; Gambia; Egypt.

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Hab. India; Celebes.

4. R. HÆMORRHOIDALE, *Sauss. Mon. Guêpes Sol.* 109. 12, ♂, ♀; *Smith, Proc. Linn. Soc.* ii. 110. 1.

Vespa hæmorrhoidalis, *Fabr. Syst. Piez.* p. 259. 28; *Oliv. Encycl. Méth.* vi. 683; *Christ, Hym.* 242.

Rygchium sanguineum, *Sauss. Mon. Guêpes Sol.* 110. 13, ♀.

Rygchium parentissimum, *Sauss. Mon. Guêpes Sol.* 111. 14.

Odynerus dimidiatus, *Guér. Voy. aux Ind. Or. de Bélanger, Zool.* 503, t. 4. f. 4.

Hab. India; Malacca; Singapore; New Guinea; Celebes; Ceram; Floris; Africa.

5. R. BRUNNEUM, *Sauss. Mon. Guêpes Sol.* 112. 16, t. 14. f. 3, ♀; *Smith, Cat. Vesp.* v. 44. 7.

Vespa brunnea, *Fabr. Syst. Piez.* p. 260. 33.

Odynerus brunneus, *Latr. Gen. Crust. et Ins.* iv. 136, t. 14. f. 3.

Hab. India.

6. R. CARNATICUM, *Sauss. Mon. Guêpes Sol.* 112. 17, ♂, ♀; *Smith, Cat. Vesp.* 44. 8.

Vespa carnatica, *Fabr. Syst. Piez.* p. 258. 22.
Hab. India (Bengal).

7. RHYNCHIUM METALLICUM, *Sauss. Mon. Guêpes Sol.* 114. 21, t. 114. f. 8, ♀; *Smith, Proc. Linn. Soc.* ii. 128. 2; *Cat. Vesp.* v. 45. 9.
Hab. India.

8. R. ARGENTATUM, *Sauss. Mon. Guêpes Sol.* 115. 22, ♂, ♀; *Smith, Cat. Vesp.* v. 45. 10.
Vespa argentata, *Fabr. Syst. Piez.* p. 260. 39.
Hab. India.

9. R. MELLYI, *Sauss. Mon. Guêpes Sol.* 116. 24, ♀; *Smith, Cat. Vesp.* v. 45. 11.
Hab. India; China.

10. R. DICHOTOMUM, *Sauss. Mon. Guêpes Sol.* 116. 25, ♂, ♀; *Smith, Cat. Vesp.* v. 45. 12.
Hab. India.

11. R. OBSCURUM, *Smith, Proc. Linn. Soc.* ii. 110. 5, ♀.
Hab. Borneo.

12. R. MIRABILE, *Sauss. Mon. Guêpes Sol.* 106. 6, t. 14. fig. 5, ♀; *Smith, Proc. Linn. Soc.* iii. 163. 1, ♂.
Hab. Aru; Australia; Tasmania.

13. R. SUPERBUM, *Sauss. Mon. Guêpes Sol.* p. 113. 18, ♀; *Smith, Proc. Linn. Soc.* iii. 163. 2.
Hab. Aru; Australia.

14. R. IRIDIPENNE, *Smith, Proc. Linn. Soc.* v. 128. 3, ♀.
Hab. Ceram.

15. R. RUBROPICTUM, *Smith, Proc. Linn. Soc.* v. 128. 4, ♀ (var. hæmorrhoidale?).
Hab. Bachian.

Gen. ODYNERUS, *Latr.*

1. ODYNERUS SICHELII, *Sauss. Mon. Guêpes Sol. Supp.* 206. 94, t. 10. f. 6, ♀; *Smith, Cat. Vesp.* v. 58. 55.
Hab. India.

2. O. PUNCTUM, *Sauss. Mon. Guêpes Sol.* 209. 114, t. 19. f. 2, ♀; *Smith, Cat. Vesp.* 59. 57.
Hab. India.

3. O. PUNCTATIPENNIS, *Sauss. Mon. Guêpes Sol.* 210. 15, ♀; *Smith, Cat. Vesp.* 59. 57.
Hab. India.

Hab. India (Bombay).

7. O. FLAVO-LINEATUS, *Smith, Cat. Vesp.* v. 60. 61, ♀.
Hab. Java; Malacca.

8. O. CONFLUENTUS, *Smith, Cat. Vesp.* v. 60. 62, ♂.
Hab. Sumatra.

9. O. RUFESCENS, *Smith, Cat. Vesp.* v. 61. 63, ♀.
Hab. Ceram.

10. O. FRAGILIS, *Smith, Cat. Vesp.* v. 61. 64, ♀.
Hab. Borneo.

11. O. MANIFESTUS, *Smith, Proc. Linn. Soc.* ii. 110. 2, ♂
Hab. Borneo.

12. O. MACULIPENNIS, *Smith, Proc. Linn. Soc.* ii. 110.
Hab. Borneo; Gilolo; Celebes.

13. O. SEPTEMFASCIATUS, *Smith, Proc. Linn. Soc.* ii. 11
Hab. Borneo.

14. O. (ANCISTROCERUS) CLAVICORNIS, *Smith, Proc.*
21. 2, ♂.
Hab. Celebes.

15. O. (LEIONOTUS) INSULARIS, *Smith, Proc. Linn.*
3, ♂.
Hab. Celebes.

16. O. PETIOLATUS, *Smith, Proc. Linn. Soc.* iii. 164. 1, ♀
Hab. Aru; Celebes; New Guinea.

17. O. AGILIS, *Smith, Proc. Linn. Soc.* iii. 164. 2, ♂.

21. ODYNERUS FACILIS, *Smith, Proc. Linn. Soc.* v. 88. 2, ♂.
Hab. Celebes.

22. O. CIRCUMSPECTUS, *Smith, Proc. Linn. Soc.* v. 88. 3, ♀ (Ancistrocerus).
Hab. Celebes.

23. O. PETULANS, *Smith, Proc. Linn. Soc.* v. 89. 4, ♀.
Hab. Celebes.

24. O. FALLAX, *Smith, Proc. Linn. Soc.* vi. 58. 2, ♀.
Hab. Gilolo.

25. O. JACULATOR, *Smith, Proc. Linn. Soc.* vii. 40. 3 (fallax, *nec* O. fallax, *Proc.* vol. vi.).
Hab. Mysol.

26. O. CONSPICUUS, *Smith, Proc. Linn. Soc.* vii. 40. 4, ♀.
Hab. Mysol.

27. O. SOBRINUS, *Smith, Proc. Linn. Soc.* vii. 40. 5, ♀.
Hab. Ceram.

28. O. LABORIOSUS, *Smith, Proc. Linn. Soc.* vii. 41. 6, ♂.
Hab. Mysol.

29. O. IMPULSUS, *Smith, Proc. Linn. Soc.* viii. 88. 4, ♀.
Hab. Morty Island.

30. O. ORNATUS, *Smith, Ann. & Mag. Nat. Hist.* (1852) ix. 49 (Ancistrocerus).
Hab. India (Bombay).

31. O. GUTTATUS, *Smith, Ann. & Mag. Nat. Hist.* (1852) ix. 49 (Ancistrocerus).
Hab. India (Khandala).

Gen. ALASTOR, *St.-Farg.*

1. ALASTOR UNIFASCIATUS, *Smith, Proc. Linn. Soc.* iii. 165. 1, ♀.
Hab. Aru.

2. A. APICATUS, *Smith, Proc. Linn. Soc.* iii. 166. 2, ♂.
Hab. Aru.

Gen. PTEROCHILUS, *Klug.*

1. PTEROCHILUS EXIMIUS, *Smith, Proc. Linn. Soc.* viii. 89. 1, ♂.
Hab. New Guinea.

Fam. VESPIDÆ, Steph.

Gen. ISCHNOGASTER, *Guér.*

1. ISCHNOGASTER FULGIPENNIS, *Guér. Voy. Coq.* ii. 269; *Sauss. Ann. Soc. Ent. Fr.* 2nd ser. x. 23; *Mon. Guêpes Soc.* 7. 1; *Smith, Cat. Vesp.* v. 92. 1.

3. I. Mellyi, *Sauss. Ann. Soc. Ent. Fr.* 2nd ser. x. 2[...]
Guêpes Soc. 9. 3; *Smith, Proc. Linn. Soc.* ii. 113. 2[...]
Hab. Malacca; Java; Borneo.

4. I. cilipennis, *Smith, Cat. Vesp.* v. 92. 4, ♂; *Pro*[...]
113. 1.
Hab. Malacca; Borneo.

5. I. nigrifrons, *Smith, Proc. Linn. Soc.* ii. 113. 3, ♀[...]
Hab. Borneo; Floris.

6. I. iridipennis, *Smith, Proc. Linn. Soc.* iii. 166. 1,[...]
Hab. Aru.

7. I. pictus, *Smith, Proc. Linn. Soc.* v. 89 1, ♀.
Hab. Celebes.

8. I. agilis, *Smith, Proc. Linn. Soc.* v. 89. 2, ♂.
Hab. Celebes.

9. I. aurifrons, *Smith, Proc. Linn. Soc.* vi. 58. 1, ♀.
Hab. Celebes.

10. I. unicolor, *Smith, Proc. Linn. Soc.* vii. 41. 2, ♂.
Hab. Mysol; Waigiou.

Gen. Belonogaster, *Sauss.*

1. Belonogaster indicus, *Sauss. Mon. Guêpes Soc.*[...]
Hab. India.

Gen. Icaria, *Sauss.*

1. Icaria aristocratica, *Sauss. Mon. Guêpes Soc.* 3[...]
Cat. Vesp. v. 97. 20.
Hab. India; Pulo Penang.

2. I. ferruginea, *Sauss. Mon. Guêpes Soc.* 38. 17. t.[...]
Vespa ferruginea, *Fabr. Ent. Syst.* ii. 280. 95.

5. ICARIA FORMOSA, *Sauss. Mon. Guêpes Soc.* 37. 16, ♀; *Smith, Cat. Vesp.* 98. 24.
Hab. India.

6. I. ARTIFEX, *Sauss. Mon. Guêpes Soc.* 25. 3, t. 4. f. 3, ☿, & p. 237, note.
Hab. India; Java.

7. I. SUMATRÆ, *Sauss. Mon. Guêpes Soc. Append.* 244.
Vespa Sumatræ, *Weber, Obs. Entom.* 103. 1.
Vespa mutillata, *Illig. Mag.* i. 189. 19.
Polistes pubescens, *Fabr. Syst. Piez.* 279. 49.
Hab. Sumatra.

8. I. SPECIOSA, *Sauss. Rev. Zool.* (1855) p. 374; *Smith, Cat. Vesp.* v. 98. 27.
Hab. Sumatra; Malacca; Borneo.

9. I. OPULENTA, *Smith, Cat. Vesp.* v. 99. 28, ♀; *Proc. Linn. Soc.* ii. 115. 2.
Hab. Borneo; Malacca; Sumatra.

10. I. FLAVO-PICTA, *Smith, Cat. Vesp.* v. 99. 29, ♀.
Hab. Borneo.

11. I. PHILIPPINENSIS, *Sauss. Mon. Guêpes Soc. Append.* 240. ♀; *Smith, Cat. Vesp.* 99. 31.
Hab. Philippines.

12. I. LEFEBVREI, *Le Guillou, Ann. Soc. Ent. Fr.* (1841) x. 322. 21, ♀.
Hab. Triton Bay.

13. I. LUGUBRIS, *Smith, Proc. Linn. Soc.* ii. 115. 4, ♀.
Hab. Borneo.

14. I. MODESTA, *Smith, Proc. Linn. Soc.* ii. 115. 5, ♀.
Hab. Borneo.

15. I. PILOSA, *Smith, Proc. Linn. Soc.* iii. 22. 2, ♂.
Hab. Celebes.

16. I. MACULIVENTRIS, *Sauss. Mon. Guêpes Soc.* 23. 1.
Rhopalidia maculiventris, *Guér. Voy. Coq.* ii. 267, pl. 9. f. 8.
Hab. Aru; New Guinea; Celebes.

17. I. NIGRA, *Smith, Proc. Linn. Soc.* iii. 167. 2, ♀.
Hab. Aru; Mysol.

18. I. FASCIATA, *Smith, Proc. Linn. Soc.* iii. 167. 3, ♀.
Hab. Aru.

22. I. MOROSA, *Smith, Proc. Linn. Soc.* vii. 42. 5, ♀.
Hab. Waigiou.

23. I. IRRITATA, *Smith, Proc. Linn. Soc.* vii. 42. 6, ♀
Hab. Mysol.

24. I. TORRIDA, *Smith, Proc. Linn. Soc.* vii. 42. 7, ♀
Hab. Ceram.

25. I. CONSERVATOR, *Smith, Proc. Linn. Soc.* v. 130
Hab. New Guinea.

26. I. IMPETUOSA, *Smith, Proc. Linn. Soc.* v. 131. 2,
Hab. Bachian; Amboyna; Ceram.

27. I. DECEPTOR, *Smith, Proc. Linn. Soc.* vii. 42. 8,
Hab. Mysol.

28. I. PICTA, *Sauss. Mon. Guêpes Soc.* 238, ☿, ♀.
Hab. Bengal.

Gen. POLISTES, *Latr.*

1. POLISTES HEBRÆUS, *Sauss. Mon. Guêpes Soc.* 53. *Smith, Cat. Vesp.* v. 101. 5.
Vespa hebræa, *Fabr. Ent. Syst.* ii. 274. 74; *Oliv. Encyc* 105.
Polistes hebræa, *Fabr. Syst. Piez.* p. 273. 21; *St.* 525. 12.
Polistes Macaensis, *Fabr. Syst. Piez.* p. 272. 12; *Wes* t. 57. f. 4.
Vespa undata, *Oliv. Encycl. Méth.* vi. 684. 72.
Hab. India; China; Isle of France; Persia.

4. Polistes hoplites, *Sauss. Mon. Guêpes Soc.* p.55. 11, ♀, & p. 255; *Smith, Cat. Vesp.* 102. 8.
Hab. India.

5. P. stigma, *Fabr. Syst. Piez.* p. 261. 41; *Sauss. Mon. Guêpes Soc.* 64. 21, ♀, t. 6. f. 3; *Smith, Cat. Vesp.* 102. 9.
Vespa tamula, *Fabr. Ent. Syst. Supp.* 263. 78.
Polistes tamula, *Fabr. Syst. Piez.* p. 261. 41.
Hab. India; Mysol; Celebes; Aru; Ceram; Sumatra.

6. P. sagittarius, *Sauss. Mon. Guêpes Soc.* 56. 12, ♀; *Smith, Proc. Linn. Soc.* ii. 113. 1; *Cat. Vesp.* 102. 10.
Hab. Borneo; India; China; Greece; Celebes; Sumatra.

7. P. tenebricosus, *St.-Farg. Hym.* i. 529. 17; *Sauss. Mon. Guêpes Soc.* 51. 5, ♀; *Smith, Cat. Vesp.* 103. 11.
Hab. Java.

8. P. maculipennis, *Sauss. Mon. Guêpes Soc.* 61. 19, t. 6. f. 4, ☿.
Hab. Java.

9. P. diabolicus, *Sauss. Mon. Guêpes Soc.* 68. 26, t. 6. f. 7, ♀; *Smith, Cat. Vesp.* v. 103. 13.
Hab. Java; Ceram; Amboyna; Timor; Aru; New Guinea; Floris.

10. P. callimorphus, *Sauss. Mon. Guêpes Soc.* 71. 31, & p. 255, ♀, ☿, t. 10. f. 1.; *Smith, Cat. Vesp.* v. 103. 14.
Hab. Timor.

11. P. lateritius, *Smith, Cat. Vesp.* v. 103. 15, ♂, ♀.
Hab. Ceram.

12. P. philippinensis, *Sauss. Mon. Guêpes Soc.* 58. 14, ♀; *Smith, Cat. Vesp.* v. 104. 19.
Hab. Philippines; Celebes; Floris.

13. P. manillensis, *Sauss. Mon. Guêpes Soc.* 70. 30, ♂; *Smith, Cat. Vesp.* v. 104. 20.
Hab. Philippines.

14. P. Picteti, *Sauss. Mon. Guêpes Soc.* 69. 28, t. 6. f. 8, ♀; *Smith, Proc. Linn. Soc.* iii. 22. 2; *Cat. Vesp.* 106. 34.
Hab. Ceram; Australia.

15. P. fastidiosus, *Sauss. Mon. Guêpes Soc.* 60. 18, ♂; *Smith, Cat. Vesp.* v. 104. 23.
Hab. New Guinea; Mysol; Celebes; Africa.

16. P. tepidus, *Fabr. Syst. Piez.* p. 271. 7; *Sauss. Mon. Guêpes Soc.* 68. 27, pl. 8. f. 1, ♀; *Smith, Cat. Vesp.* 106. 33.
Vespa tepida, *Christ, Hym.* 242; *Fabr. Ent. Syst.* ii. 262. 31.

Hab. Amboyna.

20. P. SIMULATUS, *Smith, Proc. Linn. Soc.* v. 130. 4,
Hab. Kaioa; Bachian; Morty Island.

21. P. MULTIPICTUS, *Smith, Proc. Linn. Soc.* v. 130.
Hab. Amboyna; Gilolo; Bachian; Morty Island.

22. P. SMITHII, *Sauss. Mon. Guêpes Soc.* 60. 17, t. 7.
Vesp. v. 104. 24.
Hab. Mysol; Gambia; Sierra Leone.

Gen. VESPA, *Linn.*

1. VESPA ORIENTALIS, *Linn. Syst. Nat. Mant.* p.
Piez. p. 254. 4; *Oliv. Encycl. Méth.* vi. 677. 41
p. 237; *St.-Farg. Hym.* i. 507. 5; *Ménétr. Mém. de*
Sc. de St.-Pétersb. vi. 304. 976; *Sauss. Mon. Guê*
Smith, Cat. Vesp. v. 117. 10.
V. turcica, *Drury, Illustr. Exot. Ins.* ii. t. 39. f. 1.
V. fusca, *Christ, Hym.* 216.
V. ægyptiaca, *Vallot, Tabl. de Réaum.* 170.
V. nilotica, *Vallot, Tabl. de Réaum.* 170; *Savigny, De*
Hym. pl. 8. f. 1.
Hab. India; China; Egypt; Europe.

2. V. CINCTA, *Fabr. Syst. Piez.* p. 254. 6; *Oliv. E*
676. 37; *Christ, Hym.* 219; *St.-Farg. Hym.* i. 505.
Guêpes Soc. 152. 37; *Smith, Proc. Linn. Soc.* ii. 11
v. 118. 12.
Sphex tropica, *Sulz. Hist. Ins.* t. 27. f. 5.
Vespa unifasciata, *Oliv. Encycl. Méth.* vi. 677. 39.
V. tenebrionis, *Christ*, 216.

f. 5; *Oliv. Encycl. Méth.* vi. 677. 43; *St.-Farg. Hym.* i. 508. 6; *Sauss. Mon. Guêpes Soc.* 152. 36; *Smith, Cat. Hym. Ins.* v. 118. 14.

Crabro sphinx, *Christ,* 217, t. 18. f. 5.

Hab. India.

5. VESPA BICOLOR, *Fabr. Syst. Piez.* p. 257. 15; *Oliv. Encycl. Méth.* vi. 680. 53; *St. Farg. Hym.* i. 512. 10; *Sauss. Mon. Guêpes Soc.* 143. 25; *Smith, Cat. Vesp.* 118. 16.

Hab. India; China.

6. V. VELUTINA, *St.-Farg. Hym.* i. 507. 4, ♀; *Sauss. Mon. Guêpes Soc.* 144. 26, ♂, ♀; *Smith, Cat. Hym. Ins.* v. 19. 16.

Hab. India; Java; Floris; China.

7. V. AURARIA, *Smith, Trans. Ent. Soc. Lond.* new ser. ii. 46, t. 8. f. 8; *Sauss. Mon. Guêpes Soc.* 147. 29.

Hab. North India.

8. V. OBLITERATA, *Smith, Trans. Ent. Soc. Lond.* new ser. ii. 47; *Sauss. Mon. Guêpes Soc.* 149. 32.

Hab. North India.

9. V. BASALIS, *Smith, Trans. Ent. Soc. Lond.* new ser. ii. 46; *Sauss. Mon. Guêpes Soc.* 148. 31.

Hab. India; Nepaul.

10. V. MAGNIFICA, *Smith, Trans. Ent. Soc. Lond.* new ser. i. 45; *Sauss. Mon. Guêpes Soc.* 155. 40. t. 13. f. 3, ♀.

Hab. India (Nepaul).

11. V. TYRANNICA, *Smith, Cat. Vesp.* v. 119. 21, ☿; *Proc. Linn. Soc.* ii. 116. 3.

Hab. Singapore.

12. V. DORYLLOIDES, *Sauss. Mon. Guêpes Soc. Supp.* 256.

V. anomala, *Sauss. Mon. Guêpes Soc.* 112. 1, t. 14. f. 2; *Smith, Proc. Linn. Soc.* ii. 116. 4.

Hab. India; Malacca; Borneo; Singapore; Sumatra; Java.

13. V. ALDUINI, *Guér. Voy. Coq.* t. 9. f. 5.

V. bimaculata, *Guér. Voy. Coq.* 264.

V. Alduini, *Sauss. Mon. Guêpes Soc.* 154. 38 (var. cincta?); *Smith, Proc. Linn. Soc.* vii. 43. 2; *Cat. Hym. Ins.* v. 120. 23.

Hab. Java; Ceram.

14. V. BELLICOSA, *Sauss. Mon. Guêpes Soc.* 146. 28, pl. xiv. f. 10, ♀; *Smith, Proc. Linn. Soc.* ii. 116. 5; *Cat. Vesp.* v. 120. 24.

Hab. Java; Borneo.

15. V. CRABRONIFORMIS, *Smith, Trans. Ent. Soc. Lond.* new ser. ii. 40, ♂; *Sauss. Mon. Guêpes Soc.* 145. 27.

Hab. China; India.

Gen. Polybia, *Sauss.*

1. Polybia sumatrensis, *Sauss. Guér. Rev. Mag. Zool.* (18 p. 374.
Hab. Sumatra.

2. P. stigma, *Smith, Proc. Linn. Soc.* ii. 114. 2, ♂.
Hab. Borneo.

3. P. luctuosa, *Smith, Proc. Linn. Soc.* ii. 114. 3, ♀.
Hab. Borneo.

4. P. decorata, *Smith, Proc. Linn. Soc.* ii. 114. 4, ♀.
Hab. Borneo.

5. P. artifex, *Smith, Proc. Linn. Soc.* v. 90. 1, ♀.
Hab. Celebes.

6. P. mathematica, *Smith, Proc. Linn. Soc.* v. 90. 2, ♀.
Hab. Celebes.

7. P. limatula, *Smith, Proc. Linn. Soc.* vii. 43, ♀.
Hab. Mysol.

Tribe **Anthophila**, Latr.

Fam. ANDRENIDÆ, Leach.

Gen. PROSOPIS, *Fabr.*

1. PROSOPIS MALACHISIS, *Smith, Proc. Linn. Soc.* iii. 132. 1, ♀.
Hab. Key Island.

2. P. EXIMIUS, *Smith, Proc. Linn. Soc.* v. 131. 1, ♀.
Hab. Bachian; Gilolo.

3. P. APICATA, *Smith, Proc. Linn. Soc.* vii. 44. 1, ♀.
Hab. Mysol.

4. P. LUSORIA, *Smith, Proc. Linn. Soc.* vii. 44. 2, ♀.
Hab. Mysol.

5. P. IMPERIALIS, *Smith, Proc. Linn. Soc.* vii. 44. 3, ♀.
Hab. New Guinea.

6. P. MONILICORNIS, *Motsch. Bull. Soc. Imp. des Nat. Mosc.* (1863) p. 24. 245.
Hab. Ceylon.

7. P. ELEGANS, *Smith, Proc. Linn. Soc.* viii. 91. 1, ♀.
Hab. New Guinea.

8. P. MIXTUS, *Smith, Ann. & Mag. Nat. Hist.* (1852), ix. 50.
Hab. India.

Gen. SPHECODES, *Latr.*

1. SPHECODES INSULARIS, *Smith, Proc. Linn. Soc.* iii. 5. 1, ♂.
Hab. Celebes.

Gen. NOMIA, *Latr.*

1. NOMIA CRASSIPES, *Latr. Gen. Crust. et Ins.* iv. 155; *Smith, Cat. Andren. & Ap.* 90. 15.
Eucera crassipes, *Fabr. Syst. Piez.* p. 384. 10, ♂.
Hab. India (Tranquebar).

2. N. CURVIPES, *Oliv. Encycl. Méth.* viii. 377. 6, ♂; *Smith, Cat. Andren. & Ap.* 90. 16.
Hab. India (Tranquebar).

3. N. STRIGATA, *St.-Farg. Hym.* ii. 291. 1; *Smith, Cat. Andren. & Ap.* 90. 18.
Megilla strigata, *Fabr. Syst. Piez.* p. 331. 10.
Hab. India; Java.

4. N. APICALIS, *Smith, Proc. Linn. Soc.* ii. 43. 1, ♂.
Hab. Singapore.

5. N. IRIDESCENS, *Smith, Proc. Linn. Soc.* ii. 43. 2, ♀.
Hab. India; Malacca; Bouru.

9. N. HALICTOIDES, Smith, Proc. Linn. Soc. iii. 6. 4

Hab. Celebes; Ceram.

10. N. CINCTA, *Smith, Proc. Linn. Soc*. iii. 132. 1, ♀

Hab. Key Island; Bachian.

11. N. LONGICORNIS, *Smith, Proc. Linn. Soc*. iii. 13

Hab. Aru; Bachian; Mysol.

12. N. DENTATA, *Smith, Proc. Linn. Soc*. iii. 133. 3,

Hab. Aru; Bachian; Mysol; New Guinea.

13. N. CONCINNA, *Smith, Proc. Linn. Soc*. v. 91. 1,

Hab. Celebes; Ceram.

14. N. CLAVATA, *Smith, Proc. Linn. Soc*. vi. 59. 1, ♂

Hab. Gilolo; Morty Island.

15. N. MODESTA, *Smith, Proc. Linn. Soc*. vi. 59. 2, ♀

Hab. Gilolo.

16. N. BIDENTATA, *Smith, Proc. Linn. Soc*. vii. 45. 4,

Hab. Mysol; New Guinea.

17. N. FLOREA, *Smith, Proc. Linn. Soc*. vii. 45. 5, ♂.

Hab. Mysol.

18. N. METALLICA, *Smith, Proc. Linn. Soc*. vii. 45. 6,

Hab. Waigiou.

19. N. SIMILLIMA, *Smith, Proc. Linn. Soc*. vii. 46. 7,

Hab. Ceram.

20. N. OPULENTA, *Smith, Proc. Linn. Soc*. viii. 91. 3,

Hab. Morty Island.

4. HALICTUS RUGOLATUS, *Smith, Cat. Andren. & Ap.* 62. 81, ♀.
Hab. North India.

5. H. LUCIDIPENNIS, *Smith, Cat. Andren. & Ap.* 62. 82, ♀.
Hab. North India.

6. H. XANTHOGNATUS, *Smith, Cat. Andren. & Ap.* 62. 83, ♂.
Hab. North India.

7. H. FIMBRIATUS, *Smith, Cat. Andren. & Ap.* 63. 84, ♂.
Hab. North India.

8. H. CONSTRICTUS, *Smith, Cat. Andren. & Ap.* 63. 85, ♂.
Hab. North India.

9. H. CERATINUS, *Smith, Proc. Linn. Soc.* ii. 42. 1, ♂.
Hab. Borneo.

10. H. VAGANS, *Smith, Proc. Linn. Soc.* ii. 42. 2, ♀.
Hab. Borneo.

11. H. BASALIS, *Smith, Proc. Linn. Soc.* ii. 42. 3, ♂.
Hab. Singapore.

12. H. FRATERNUS, *Smith, Proc. Linn. Soc.* v. 91. 1, ♀.
Hab. Celebes.

Gen. CTENOPLECTRA, *Smith.*

1. CTENOPLECTRA CHALYBEA, *Smith, Proc. Linn. Soc.* ii. 45. 1, ♀.
Hab. Malacca; Celebes.

Fam. APIDÆ Auct.

Gen. MEGACHILE, *Latr.*

1. MEGACHILE LANATA, *St.-Farg. Hym.* ii. 342. 15; *Smith, Cat. Andren. & Ap.* 177. 97.
Anthophora lanata, *Fabr. Syst. Piez.* p. 372. 1.
Hab. India.

2. M. DISJUNCTA, *St.-Farg. Hym.* ii. 331. 3; *Smith. Cat. Andren. & Ap.* 178. 98.
Anthrophora disjuncta, *Fabr. Syst. Piez.* p. 374. 10.
Hab. India; Mauritius.

3. M. RUFIVENTRIS, *Guér. Voy. Ind. Orient.* (*Belang.*), p. 502, t. 4. f. 5; *Smith, Cat. Andren. & Ap.* 178. 99.
Hab. India; Mauritius.

4. M. FRATERNA, *Smith, Cat. Andren. & Ap.* 178. 100.

[illegible] *mith, Cat. Andren. &* [illegible] 101, ♀.

24. MEGACHILE IMITATRIX, *Smith, Cat. Andren. & Ap.* 177. 95, ♀.
Hab. India.

25. M. AMPUTATA, *Smith, Proc. Linn. Soc.* ii. 45. 4, ♀.
Hab. Borneo.

26. M. TUBERCULATA, *Smith, Proc. Linn. Soc.* ii. 46. 5, ♀.
Hab. Borneo.

27. M. ARCHITECTA, *Smith, Proc. Linn. Soc.* ii. 46. 6, ♀.
Hab. Borneo.

28. M. LUCTUOSA, *Smith, Proc. Linn. Soc.* ii. 46. 7, ♀.
Hab. Singapore.

29. M. ROTUNDICEPS, *Smith, Proc. Linn. Soc.* ii. 47. 8, ♀.
Hab. Malacca.

30. M. INCISA, *Smith, Proc. Linn. Soc.* iii. 6. 1, ♂.
Hab. Celebes.

31. M. FULVIFRONS, *Smith, Proc. Linn. Soc.* iii. 6. 2, ♀.
Hab. Celebes; Timor.

32. M. TERMINALIS, *Smith, Proc. Linn. Soc.* iii. 7. 3, ♀.
Hab. Celebes.

33. M. LATERITIA, *Smith, Proc. Linn. Soc.* iii. 134. 1, ♀.
Hab. Aru.

34. M. SCABROSA, *Smith, Proc. Linn. Soc.* iii. 134. 2, ♀.
Hab. Aru; Bouru.

35. M. INSULARIS, *Smith, Proc. Linn. Soc.* iii. 134. 3, ♀.
Hab. Aru.

36. M. PLUTO, *Smith, Proc. Linn. Soc.* v. 133. 1, ♀.
Hab. Bachian.

37. M. LACHESIS, *Smith, Proc. Linn. Soc.* v. 133. 2, ♀.
Hab. Bachian; Amboyna; Ternate; Mysol; Bouru.

38. M. CLOTHO, *Smith, Proc. Linn. Soc.* v. 134. 3, ♀.
Hab. Bachian; Gilolo.

39. M. ALECTO, *Smith, Proc. Linn. Soc.* v. 134. 4, ♂.
Hab. New Guinea; Gilolo; Ternate; Mysol.

40. M. FOLIATA, *Smith, Proc. Linn. Soc.* v. 134. 5, ♀.
Hab. Bachian.

41. M. VENTRALIS, *Smith, Proc. Linn. Soc.* v. 134. 6, ♀.
Hab. Amboyna.

42. M. ATERRIMA, *Smith. Proc. Linn. Soc.* vi. 60. 4, ♀.
Hab. Celebes.

43. M. PLACIDA, *Smith, Proc. Linn. Soc.* vi. 60. 5, ♂.
Hab. Gilolo; Ternate; Mysol.

2. NOMADA LUSCA, *Smith, Cat. Ap.* 243. 58, ♀.
Hab. Philippines.

3. N. DECORATA, *Smith, Cat. Ap.* 243. 59, ♀.
Hab. North India.

4. N. BIPUNCTATA, *Fabr. Syst. Piez.* p. 392. 8; *St.-Farg. Encycl. Méth.* viii. 369. 20.
Hab. India.

5. N. INSULARIS, *Smith, Proc. Linn. Soc.* vii. 47. 1, ♀.
Hab. Ceram.

6. N. CONSPICUA, *Smith, Proc. Linn. Soc.* vii. 47. 2, ♂.
Hab. Timor.

Gen. CŒLIOXYS, *Latr.*

1. CŒLIOXYS INTRUDENS, *Smith, Proc. Linn. Soc.* v. 92. 1, ♀.
Hab. Bachian; Bouru.

2. C. FULVIFRONS, *Smith, Proc. Linn. Soc.* iii. 7. 2, ♂.
Hab. Celebes.

Gen. STELIS, *Panz.*

1. STELIS ABDOMINALIS, *Smith, Proc. Linn. Soc.* iii. 7. 1, ♂.
Hab. Celebes.

Gen. CERATINA, *Latr.*

1. CERATINA VIRIDIS, *Guér. Icon. Règ. Anim.* 444, t. 73. f. 6; *Smith, Cat. Andren. & Ap.* 224. 9.
Hab. Bengal; Ceylon; China; Celebes.

2. C. PICTA, *Smith, Cat. Andren. & Ap.* 224. 10, ♀.
Hab. Ceylon.

3. C. SIMILLIMA, *Smith, Cat. Andren. & Ap.* 225. 11, ♂.
Hab. India.

4. C. HIEROGLYPHICA, *Smith, Cat. Andren. & Ap.* 226. 13, ♀.
Hab. North India; China; Philippines, Borneo; Celebes.

5. C. MACULATA, *Smith, Cat. Andren. & Ap.* 226. 14, ♂.
Hab. Java.

6. C. SMARAGDINA, *Smith, Cat. Andren. & Ap.* 226. 15, ♀.
Hab. Java.

7. C. FLAVOPICTA, *Smith, Proc. Linn. Soc.* ii. 47. 2, ♀.
Hab. Borneo.

8. C. PICTIFRONS, *Smith, Proc. Linn. Soc.* v. 92. 1, ♀.
Hab. Celebes.

Gen. TETRALONIA, *Spin.*

1. TETRALONIA FLORALIA, *Smith, Cat. Ap.* 302. 32, ♂.
Hab. India.

3. X. INDICA, *Klug, Mag. der Gesell. Nat. Fr. zu Berlin* (1807), t. 7. f. 2.
Hab. Tranquebar.

4. X. VERTICALIS, *St.-Farg. Hym.* ii. 195. 38; *Smith Cat. Ap.* 352. 39.
Hab. India; Singapore; Celebes; Timor.

5. X. VIRIDIPENNIS, *St.-Farg. Hym.* ii. 205. 54.
Hab. India; Philippines.

6. X. TENUISCAPA, *Westw. Nat. Libr.* xxxviii. 271, t. 23. f. 2, ♂; *St.-Farg. Hym.* ii. 203. 51, ♂, ♀; *Smith, Cat. Ap.* 353. 43.
Hab. India; Ceylon.

7. X. RUFICORNIS, *Fabr. Syst. Piez.* p. 341. 12; *Smith, Cat. Ap.* 353. 42.
Hab. India.

8. X. IRIDIPENNIS, *St.-Farg. Hym.* ii. 188. 23; *Smith, Cat. Ap.* 353. 44.
Hab. India.

9. X. FERRUGINEA, *St.-Farg. Hym.* ii. 187. 22; *Smith, Cat. Ap.* 353. 45.
Hab. India.

10. X. FENESTRATA, *Fabr. Syst. Piez.* p. 339. 6; *St.-Farg. Hym.* ii. 184. 15; *Smith, Cat. Ap.* 353. 46.
Hab. India; Mysol.

11. X. COLLARIS, *St.-Farg. Hym.* ii. 189. 26; *Smith, Cat. Ap.* 353. 47.
Hab. India; Sumatra; Malacca; Borneo; Celebes.

12. X. OLIVIERI, *St.-Farg. Hym.* ii. 192. 34.
Hab. India; Bagdad.

13. X. (APIS) ÆSTUANS, *Linn. Syst. Nat.* i. 961. 53, ♀; *Fabr. Ent. Syst.* ii. 323. 41; *St.-Farg. Hym.* ii. 193. 36.
Apis leucothorax, *De Geer, Ins.* iii. 573. 4, t. 28. f. 7.
Bombus æstuans, *Fabr. Syst. Piez.* p. 351. 44.
Hab. India; China; Malacca; Borneo; Sumatra; Java; Celebes; Aru; Timor; Australia.

14. X. ORICHALCEA, *St.-Farg. Hym.* ii. 181. 10.
Hab. India; China.

15. X. FLAVONIGRESCENS, *Smith, Cat. Ap.* 354. 52, ♂.
Hab. Silhet.

16. X. ACUTIPENNIS, *Smith, Cat. Ap.* 355. 53, ♂.
Hab. Silhet.

Gen. Bombus, *Latr.*

1. Bombus rufipes, *St.-Farg. Hym.* i. 473. 25; *Smith, Cat. Ap.* 401. 66.
Hab. Java.

2. B. tunicatus, *Smith, Trans. Ent. Soc.* ii. new ser. 43, t. 8. f. 7, ♀.
Hab. North India; N. China.

3. B. rufofasciatus, *Smith, Trans. Ent. Soc.* ii. new ser. 48, ♀.
Hab. North India.

4. B. orientalis, *Smith, Cat. Ap.* 402. 71, ♀.
Hab. India.

5. B. hæmorrhoidalis, *Smith, Trans. Ent. Soc.* ii. new ser. 43.
Hab. India.

6. B. funerarius, *Smith, Trans. Ent. Soc.* ii. new ser. 47, t. 8. f. 6, ♀.
Hab. North India.

7. B. eximius, *Smith, Trans. Ent. Soc.* ii. new ser. 47, t. 8. f. 5, ♀.
Hab. Silhet.

8. Bombus similis, *Smith, Trans. Ent. Soc.* ii. new ser. p. 48.
Hab. N. India.

Gen. Trigona, *Jurine.*

1. Trigona vidua, *St.-Farg. Hym.* i. 429. 24.
Hab. India; Timor.

2. T. ventralis, *Smith, Proc. Linn. Soc.* ii. 50. 1, ☿.
Hab. Borneo; Malacca.

3. T. atripes, *Smith, Proc. Linn. Soc.* ii. 50. 2, ☿.
Hab. Malacca.

4. T. thoracica, *Smith, Proc. Linn. Soc.* ii. 50. 3, ☿.
Hab. Singapore.

5. T. nitidiventris, *Smith, Proc. Linn. Soc.* ii. 50. 4, ☿.
Hab. Malacca.

6. T. apicalis, *Smith, Proc. Linn. Soc.* ii. 51. 6, ☿.
Hab. Borneo.

7. T. læviceps, *Smith, Proc. Linn. Soc.* ii. 51. 5, ☿.
Hab. Singapore.

8. T. canifrons, *Smith, Proc. Linn. Soc.* ii. 51. 7, ☿.
Hab. Borneo.

Apis lobata, *Smith, Cat. Hym. Ins. Apidæ*, ii. 416, ♂.
A. indica, *Latr. Ann. Mus. Hist. Nat.* v. 169.
Hab. India; Borneo; Ceylon.

Fam. CHRYSIDIDÆ.

Gen. Stilbum, *Spin.*

1. Stilbum splendidum, *Fabr. Syst. Piez.* p. 170. 1. (Chrysis); *Smith, Proc. Linn. Soc.* iii. 177. 1.
Hab. Tranquebar; Bengal; Aru; Java; Celebes.

2. S. amethystinum, *Fabr. Syst. Piez.* p. 176. 32; *Smith, Proc. Linn. Soc.* iii. 177. 2.
Hab. Aru; Australia.

Gen. Hedychrum, *Latr.*

1. Hedychrum timidum, *Dahlb. Hym. Europ.* ii. 65. 36.
Hab. India (Bengal).

2. H. rugosum, *Smith, Ann. & Mag. Nat. Hist.* (1852) 2nd ser. ix. 45.
Hab. India (Poonah).

3. H. flammulatum, *Smith, Proc. Linn. Soc.* iii. 26. 1.
Hab. Celebes.

4. H. orientale, *Smith, Proc. Linn. Soc.* ii. 128. 1.
Hab. Singapore.

Gen. Holopyga, *Dahlb.*

1. Holopyga purpurea, *Smith, Proc. Linn. Soc.* v. 68. 1.
Hab. Celebes.

Gen. Chrysis, *Linn.*

1. Chrysis dissimilis, *Dahlb. Hym. Europ.* ii. 202. 109.
Hab. India (Bengal).

2. C. Reichei, *Dahlb. Hym. Eur.* ii. 218. 119.
Hab. Coromandel.

3. C. orientalis, *Dahlb. Hym. Eur.* ii. 225. 124, ♀.
Hab. India.

4. C. amethystina, *Fabr. Syst. Piez.* 176. 32; *Dahlb. Hym. Eur.* ii. 229. 127, ♂, ♀.
Hab. India.

5. C. exulans, *Dahlb. Hym. Eur.* ii. 247. 137.
Hab. India (Bengal).

Fam. EVANIADÆ, Shuck.

Gen. Evania, *Fabr.*

1. Evania lævigata, *Latr. Gen. Crust. et Ins.* iii. 251; *Westw. Mon. Evan. &c. Trans. Ent. Soc. Lond.* iii. 241.
Hab. Celebes; India; New Guinea; Africa; Australia; Brazil; Mexico.

2. E. antennalis, *Westw. Trans. Ent. Soc. Lond.* iii. 244. 13.
Hab. India.

3. E. striata, *Smith, Proc. Linn. Soc.* v. 58. 1, ♀.
Hab. Celebes.

Gen. Hyptia, *Illiger.*

1. Hyptia javanica, *Westw. Trans. Ent. Soc. Lond.* iii. 245. 22.
Hab. Java.

Gen. Fœnus, *Fabr.*

1. Fœnus gracilis, *Smith, Proc. Linn. Soc.* iii. 169. 1, ♀.
Hab. Aru; Celebes.

Fam. AULACIDÆ, Shuck.

Gen. Trygonalys, *Westw.*

1. Trigonalys pictifrons, *Smith, Proc. Linn. Soc.* v. 57. 1, ♂, ♀.
Hab. Celebes.

Gen. Aulacus, *Jurine.*

1. Aulacus signatus, *Shuck. Entom.* (1841), 124. 7.
Hab. Ceylon.

Gen. Stenophasmus, *Smith.*

1. Stenophasmus ruficeps, *Smith, Proc. Linn. Soc.* iii. 170. 1, ♀.
Hab. Aru.

Gen. Fœnatopus, *Smith.*

1. Fœnatopus ruficeps, *Smith, Proc. Linn. Soc.* v. 58. 1, ♀.
Hab. Celebes.

Gen. Megischus, *Brullé.*

1. Megischus (Pimpla) coronator, *Fabr. Syst. Piez.* p. 118. 28; *St.-Farg. Encycl. Méth.*; *Brullé, Hym.* iv. 538. 1; *Westw. Trans. Ent. Soc. Lond.* iii. 276. 2 (1841); *Smith, Proc. Linn. Soc.* v. 137. 1, ♀.
Hab. India; Bachian; New Guinea; Amboyna; Morty Island; Salwatty.

2. M. indicus, *Westw. Trans. Ent. Soc. Lond.* (1841) iii. 277. 9, ♀,

3. I. COMISSATOR, *Smith, Proc. Linn. Soc.* ii. 118. 2, ♂.
Hab. Borneo.

4. I. INSULARIS, *Smith, Proc. Linn. Soc.* iii. 170. 1.
Hab. Key Island; Celebes.

5. I. SICARIUS, *Smith, Proc. Linn. Soc.* v. 59. 1, ♂ (I. insularis, Sm. nec sp. 4).
Hab. Celebes.

6. I. PRÆDATORIUS, *Smith, Proc Linn. Soc.* v. 59. 2.
Hab. Celebes.

7. I. EPHIPPIUM, *Smith, Proc. Linn. Soc.* v. 59. 3, ♀.
Hab. Celebes.

8. I. PALLIDIPICTUS, *Smith, Proc. Linn. Soc.* vi. 62. 1.
Hab. Celebes.

Gen. TRYPHON, *Grav.*

1. TRYPHON LUTORIUS, *Smith, Proc. Linn. Soc.* v. 60. 1.
Hab. Celebes.

Gen. ISCHNOCERUS, *Grav.*

1. ISCHNOCERUS DIMIDIATUS, *Brullé, Hym.* iv. 262. 3, ♀, pl. 42. f. 1.
Hab. New Guinea.

2. ISCHNOCERUS CANCELLATUS, *Brullé, Hym.* iv. 262. 4, ♀.
Hab. Java.

3. I. FASCIATA, *Smith, Proc. Linn. Soc.* v. 62. 1, ♀ (maculipennis, *Smith, nec Brullé*).
Hab. Celebes.

Gen. METOPIUS, *Panz.*

1. METOPIUS CRASSIPES, *Smith, Proc. Linn. Soc.* v. 62. 1.
Hab. Celebes.

Gen. CRYPTUS, *Fabr.*

1. CRYPTUS TRICOLOR, *Brullé, Hym.* iv. 195. 16, ♂.
Hab. India.

2. C. MESOXANTHUS, *Brullé, Hym.* iv. 196. 17, ♀.
Hab. Java.

3. C. ELEGANTULUS, *Brullé, Hym.* iv. 198. 19, ♀.
Hab. Java.

4. C. CROCEIPES, *Smith, Proc. Linn. Soc.* ii. 118. 1, ♀.
Hab. Borneo.

5. C. ELEGANS, *Smith, Proc. Linn. Soc.* ii. 118. 2, ♀.
Hab. Borneo.

6. C. LEPIDUS, *Smith, Proc. Linn. Soc.* ii. 119. 3, ♀.
Hab. Borneo.

7. C. SCUTELLATUS, *Smith, Proc. Linn. Soc.* iii. 170. 1, ♀.
Hab. Aru.

8. C. OPACUS, *Smith, Proc. Linn. Soc.* v. 60. 1, ♀.
Hab. Celebes.

9. C. SPOLIATOR, *Smith, Proc. Linn. Soc.* v. 61. 2, ♀.
Hab. Celebes.

10. C. ALBO-PICTUS, *Smith, Proc. Linn. Soc.* v. 61. 3, ♀.
Hab. Celebes; Mysol.

11. C. VARIEGATUS, *Smith, Proc. Linn. Soc.* v. 61. 4. ♀.
Hab. Celebes.

12. C. PETIOLATUS, *Smith, Proc. Linn. Soc.* v. 62. 5, ♀.
Hab. Celebes.

13. C. SICARIUS, *Smith, Proc. Linn. Soc.* v. 138. 1, ♀.
Hab. Dory; Bachian; Gilolo; Celebes.

14. C. FERRUGINEUS, *Smith, Proc. Linn. Soc.* vi. 63. 2, ♀.
Hab. Celebes.

15. C. VOLATILIS, *Smith, Proc. Linn. Soc.* vii. 7. 2, ♀.
Hab. Mysol; New Guinea.

13. Mesostenus insidiator, *Smith, Proc. Linn. Soc.* v. 60. 1, ♀.
Hab. Celebes.

14. M. decoratus, *Smith, Proc. Linn. Soc.* vi. 63. 1, ♀.
Hab. Gilolo.

15. M. multipictus, *Smith, Proc. Linn. Soc.* vii. 8. 1, ♀.
Hab. Mysol.

16. M. pulcherrimus, *Smith, Proc. Linn. Soc.* vii. 8. 2, ♀.
Hab. Waigiou.

17. M. arrogans, *Smith, Proc. Linn. Soc.* viii. 63. 2, ♀.
Hab. New Guinea.

Gen. Hemiteles, *Grav.*

1. Hemiteles tripartitus, *Brullé, Hym.* iv. 258. 9, ♂.
Hab. India (Pondicherry).

Gen. Glypta, *Grav.*

1. Glypta maculipennis, *Smith, Proc. Linn. Soc.* v. 62. 1, ♀.
Hab. Celebes.

2. G. iridipennis, *Smith, Proc. Linn. Soc.* v. 63. 2, ♀.
Hab. Celebes.

3. G. fracticornis, *Smith, Proc. Linn. Soc.* vii. 10. 1, ♀.
Hab. Mysol; New Guinea.

Gen. Pimpla, *Fabr.*

1. Pimpla punctum, *Brullé, Hym.* iv. 87. 1, ♂.
Hab. Philippines.

2. P. bipartita, *Brullé, Hym.* iv. 88. 2, ♀.
Hab. India.

3. P. eructator, *Brullé, Hym.* iv. 88. 3, ♀.
Hab. New Guinea.

4. P. flaviceps, *Brullé, Hym.* iv. 93. 11, ♀.
Hab. New Guinea.

5. P. punctata, *Fabr. Syst. Piez.* p. 119. 32; *Brullé, Hym.* iv. 94. 13; *Smith, Proc. Linn. Soc.* ii. 119. 1.
Hab. India; Borneo.

6. P. pedator, *Fabr. Syst. Piez.* p. 114. 6; *Brullé, Hym.* iv. 94. 14. ♀.
Hab. India.

7. P. trimaculata, *Smith, Proc. Linn. Soc.* iii. 24. 2. ♀.
Hab. Celebes.

Hab. Key Island.

12. P. PLAGIATA, *Smith, Proc. Linn. Soc.* iii. 173. 5,
Hab. Aru.

13. P. INFIRMA, *Smith, Proc. Linn. Soc.* v. 63. 1, ♀.
Hab. Celebes.

14. P. UNICOLOR, *Smith, Proc. Linn. Soc.* v. 63. 2, ♀
Hab. Celebes.

15. P. INSOLENS, *Smith, Proc. Linn. Soc.* v. 64. 3, ♀.
Hab. Celebes.

16. P. MODESTA, *Smith, Proc. Linn. Soc.* v. 64. 4, ♀.
Hab. Celebes.

17. P. VIRIDIPENNIS, *Smith, Proc. Linn. Soc.* v. 64.
Hab. Celebes.

18. P. FORMOSA, *Smith, Proc. Linn. Soc.* v. 139. 1, ♀
Hab. Bachian.

19. P. FENESTRATA (FLAVICEPS, *Smith, Proc. Lin*
2, ♀, nec flaviceps, *Brullé*).
Hab. Bachian.

20. P. INTEGRATA, *Smith, Proc. Linn. Soc.* v. 140. 3,
Hab. Bachian.

21. P. PLACIDA, *Smith, Proc. Linn. Soc.* v. 140. 4, ♀
Hab. Bachian.

22. P. ARROGANS, *Smith, Proc. Linn. Soc.* vii. 8. 2, ♀
Hab. Ceram.

23. P. APICALIS, *Smith, Proc. Linn. Soc.* vii. 9. 3, ♂.

27. Pimpla inimica, *Smith, Proc. Linn. Soc.* vii. 10. 7, ♀.
Hab. Mysol.

28. P. caudata, *Smith, Proc. Linn. Soc.* vii. 10. 8, ♀.
Hab. Mysol.

29. P. obnoxia, *Smith, Proc. Linn. Soc.* viii. 64. 6, ♀.
Hab. Morty Island.

30. P. diligens, *Smith, Proc. Linn. Soc.* viii. 64. 7, ♀.
Hab. Morty Island.

31. P. trifasciata, *Smith, Proc. Linn. Soc.* viii. 64. 8, ♀.
Hab. New Guinea.

32. P. nigricornis, *Smith, Proc. Linn. Soc.* viii. 64. 9, ♂.
Hab. New Guinea.

33. P. interceptor, *Smith, Proc. Linn. Soc.* viii. 65. 10, ♀.
Hab. New Guinea.

Gen. Macrogaster, *Brullé.*

1. Macrogaster flavo-pictus, *Smith, Proc. Linn. Soc.* ii. 121. 1, ♀.
Hab. Singapore.

Gen. Rhyssa, *Grav.*

1. Rhyssa mirabilis, *Smith, Proc. Linn. Soc.* ii. 120. 1, ♀.
Hab. Borneo.

2. R. maculipennis, *Smith, Proc. Linn. Soc.* ii. 120. 2, ♀.
Hab. Borneo.

3. R. fasciata, *Smith, Proc. Linn. Soc.* iii. 173. 1, ♂ (R. maculipennis, *Smith,* nec sp. 2).
Hab. Aru.

4. R. vestigator, *Smith, Proc. Linn. Soc.* iii. 174. 2, ♂.
Hab. Aru.

5. R. nobilitator, *Smith, Proc. Linn. Soc.* vi. 63. 1, ♀.
Hab. Celebes.

Gen. Anomalon, *Grav.*

1. Anomalon falcator, *Smith, Proc. Linn. Soc.* v. 64. 1.
Hab. Celebes.

Gen. Xylonomus, *Grav.*

1. Xylonomus fulgidipennis, *Smith, Proc. Linn. Soc.* v. 122. 1, ♀.
Hab. Borneo.

2. H. flavifrons, *Smith, Proc. Linn. Soc.* vi. 64. 1, ♀.
Hab. Gilolo.

3. Bracon dimidiator, *Fabr. Syst. Piez.* p. 104. 12.
Hab. Sumatra.

4. B. femorator, *Fabr. Syst. Piez.* p. 107. 23.
Hab. India (Tranquebar).

5. B. armator, *Fabr. Syst. Piez.* p. 107. 25.
Hab. Sumatra.

6. B. exspectator, *Fabr. Syst. Piez.* p. 108. 27.
Hab. Sumatra.

7. B. flavifrons, *Fabr.*, *Brullé, Hym.* iv. 417. 102, ♂.
Hab. Java.

8. B. Brullei, *Smith.*
B. laminator, *Brullé, Hym.* iv. 419. 104 (nec *Fabr.*).
Hab. India.

9. B. nigrifrons, *Brullé, Hym.* iv. 421. 105, ♀.
Hab. Philippines.

10. B. nigridorsis, *Brullé, Hym.* iv. 422. 107, ♀.
Hab. Java.

11. B. larva, *Brullé, Hym.* iv. 422, 108.
Hab. Java.

12. B. hindostanus, *Smith.*
B. apicalis, *Brullé, Hym.* iv. 432. 119 (nec B. apicalis, *Hym.* 385. 63, Cayenne).
Hab. India.

13. B. marginellus, *Brullé, Hym.* iv. 435. 123, ♀.
Hab. New Guinea.

14. B. insinuator, *Smith, Proc. Linn. Soc.* iii. 24. 1, ♀.
Hab. Celebes.

15. B. intrudens, *Smith, Proc. Linn. Soc.* iii. 25. 2, ♀.
Hab. Celebes.

16. B. quadriceps, *Smith, Proc. Linn. Soc.* ii. 122. 2, ♀ (Myosoma, *Brullé*?).
Hab. Borneo.

17. B. suspiciosus, *Smith, Proc. Linn. Soc.* ii. 123. 3, ♀ (Myosoma?).
Hab. Borneo.

18. B. insignis, *Smith, Proc. Linn. Soc.* ii. 123. 4, ♀.
Hab. Borneo.

19. B. cephalotes, *Smith, Proc. Linn. Soc.* ii. 123. 5, ♀.
Hab. Borneo.

30. B. albo-marginatus, *Smith, Proc. Linn. Soc.* iii. 175. 3, ♀.
Hab. Aru.

31. B. nigripennis, *Smith, Proc. Linn. Soc.* iii. 175. 3, ♀.
Hab. Aru.

32. B. exoletus, *Smith, Proc. Linn. Soc.* iii. 175. 4, ♀.
Hab. Aru.

33. B. abdominalis, *Smith, Proc. Linn. Soc.* iii. 175. 5, ♀.
Hab. Aru.

34. B. nitidus, *Smith, Proc. Linn. Soc.* iii. 175. 6, ♀.
Hab. Aru.

35. B. pallifrons, *Smith, Proc. Linn. Soc.* iii. 176. 7, ♀.
Hab. Aru.

36. B. salutator, *Smith.*
B. intrudens, *Smith, Proc. Linn. Soc.* iii. 176. 8, ♀ (nec B. intrudens, iii. 25. 2).
Hab. Aru.

37. B. deceptor, *Smith, Proc. Linn. Soc.* v. 65. 1, ♀.
Hab. Celebes.

38. BRACON BELLICOSUS, *Smith, Proc. Linn. Soc.* v. 65. 2, ♀.
Hab. Celebes.

39. B. COMBUSTUS, *Smith, Proc. Linn. Soc.* v. 65. 3, ♀.
Hab. Celebes.

40. B. JACULATOR, *Smith, Proc. Linn. Soc.* v. 141. 2, ♀.
Hab. Bachian.

41. B. QUADRICEPS, *Smith, Proc. Linn. Soc.* v. 141. 3, ♀.
Hab. Bachian.

42. B. INGENS, *Smith, Proc. Linn. Soc.* vi. 25. 1, ♀.
Hab. Celebes.

43. B. PENETRANS, *Smith, Proc. Linn. Soc.* vi. 65. 3, ♀ (Myosoma?).
Hab. Ceram.

44. B. OCCULTATOR, *Smith, Proc. Linn. Soc.* vii. 11. 1, ♀.
Hab. Mysol.

45. B. PENETRATOR, *Smith, Proc. Linn. Soc.* vii. 11. 2, ♀.
Hab. Mysol.

46. B. GRAVIDUS, *Smith, Proc. Linn. Soc.* viii. 66. 3, ♀.
Hab. New Guinea.

47. B. FERAX, *Smith, Proc. Linn. Soc.* viii. 66. 4, ♀.
Hab. New Guinea.

48. B. FLAVICEPS, *Smith, Proc. Linn. Soc.* viii. 66. 5, ♀.
Hab. Salwatty.

Gen. AGATHIS, *Latr.*

1. AGATHIS TERMINALIS, *Brullé, Hym.* iv. 484. 2, ♀.
Hab. Bouru.

2. A. FLAVIPENNIS, *Brullé, Hym.* iv. 484. 3, ♂.
Hab. India; Singapore.

3. A. GUINEENSIS nec FLAVIPENNIS, *Brullé, Hym.* iv. 485. 4, ♂.
Hab. New Guinea (Dory).

4. A. CLATHRATA, *Brullé, Hym.* iv. 487. 7, ♂.
Hab. Java.

5. A. MACULIPENNIS, *Brullé, Hym.* iv. 488. 9, ♂.
Hab. India.

6. A. SUBFASCIATA, *Brullé, Hym.* iv. 489. 10, ♀.
Hab. India.

7. A. SEMIFUSCA, *Brullé, Hym.* iv. 490. 11, ♂.
Hab. India.

Fam. TENTHREDINIDÆ, Leach.

Gen. Cladomacra, *Smith*.

1. Cladomacra macropus, *Smith, Proc. Linn. Soc.* vi. 66. 1, ♂; *Ann. & Mag. Nat. Hist.* (1860) vi. 257.
Hab. Celebes.

Gen. Tenthredo, *Linn*.

1. Tenthredo coxalis, *Smith, Proc. Linn. Soc.* ii. 116. 1, ♀.
Hab. Singapore.

Gen. Xyphidria, *Latr*.

1. Xyphidria rufipes, *Smith, Proc. Linn. Soc.* iii. 177. 1, ♀.
Hab. Aru.

2. X. læviceps, *Smith, Proc. Linn. Soc.* v. 137. 1, ♀.
Hab. Amboyna.

Gen. Oryssus, *Fabr*.

1. Oryssus maculipennis, *Smith, Proc. Linn. Soc.* iii. 177. 1, ♀.
Hab. Aru.

Gen. Tremex, *Jurine*.

1. Tremex insularis, *Smith, Proc. Linn. Soc.* ii. 117. 1, ♀.
Hab. Borneo.

2. T. insignis, *Smith, Proc. Linn. Soc.* iii. 178. 1, ♀.
Hab. Aru.

A Table is appended giving the geographical distribution of those of the foregoing genera of which twenty species or upwards have been noticed, and a summary of the entire species enumerated.

Observations on a Light-giving Coleopterous Larva By Dr. Hermann Burmeister, F.M.L.S.

[Read December 7, 1871.]

In a box of books lately (April 18, 1871) received from I I was pleased to find the continuation of the 'Journal Linnean Society' in exchange for the 'Annals of the Museum of Buenos Ayres.'

Amongst the papers which attracted my attention was o light-giving Coleopterous larva, named *Astraptor illu* (vol. x. p. 74), collected by Mr. A. Fry at Rio de Janei described and figured (Pl. I.) by Mr. A. Murray.

To the detailed description by Mr. Murray, some futh tices are added in the same volume (p. 503) by another ol Mr. R. Trimen, wherein he mentions a similar larva foun in Buenos Ayres, by Mr. Ogilvie, twelve years ago.

I was so fortunate as to observe the same larva at Para former capital of the Argentine Republic, in August 185 as Mr. Trimen's notice is rather brief, I thought it migh some interest to the Society to receive a fuller descriptio figures, which I therefore now send, in the hope that this may bring forward some information as to the imago state insect produced from the larva, which has now been kn some time. I say advisedly that the larva has long been because Azara speaks of the same larva in his 'Voyage' p. 214, alluding to the double light from the body; and full description of a nearly allied species from Brazil by Prof. F. T. Reinhardt, of Copenhagen, in a Danish pe work which I do not exactly remember, but which I bel be the 'Videnskabelige Meddelelser' for 1854.

My larva was of the same size as that described by Azara, 2 long and a ¼ inch broad. The body was composed of th and thirteen joints, of which the largest is that next the and the smallest is the short tube containing the anus colour was yellowish-brown, like that of the meal-worm larva of *Tenebrio molitor*), with the head rather darker. O mining the insect attentively, I could perceive that a larg of the surface of the body (namely the whole of the unde and the incisions between the segments were of a pale lowish-white colour, and the skin was here very thin and but on the upperside every one of the eleven segments,

that immediately behind the head, had two small yellow-brown horny plates, one on each side of the dorsal vessel; the prothoracic segment and the penultimate segment were entirely covered with undivided horny plates of a rather darker colour; and the small terminal segment had a darker brown lateral scale on each side. The body of this larva was not smooth, like that of the meal-worm, but clothed with short hairs or bristles, placed on the dorsal horny plates, and with their points directed outwards, the remaining portions of the segments being smooth or naked.

My fig. 1 gives an exact view of this construction of the larva, natural size.

The head (fig. 2, magnified) is small in comparison with the large prothoracic segment, and somewhat retracted within that segment; it is covered by a darker horny skin, and is of a transverse oval form, with a short neck posteriorly, which fits into the anterior opening of the prothoracic segment. On the most prominent parts of the sides of the head are situated the eyes, which are black; in front of these are the short antennæ, placed on small prominences of the anterior lateral surface of the head. The antennæ consist of four joints: the first and broadest is soft, white, and conical; the second of the same length as the first, but more slender, horny, and dark brown, like the succeeding joints, and obconical; the third is oval, and rather thicker than the second; the fourth, inserted on the inner edge of the third

before the end, is a very short and thin point. Between t prominences on which the antennæ are placed, is an imp angular line, starting from the anterior base of each em and emitting posteriorly, from the angle, another, short imp line, which becomes evanescent between the eyes. This verse line separates the small clypeus, of the same angulated which has its anterior margin likewise angulated, support soft (not horny) white upper lip, which is rather broade long, and emarginated in the middle of the free margin. sides of this upper lip, next to the antennæ, the mandib conspicuous as two strong horny hooks of very dark colou a thin but very acute curved tip and a small angular tooth middle of the inside. Beneath the mandibles are situat maxillæ, united with the intervening under lip, into a horny plate, divided by two ridges into three parts magnified).

Of these three parts, the lateral ones are the broade longest, representing the trunks of the maxillæ, broadest base, narrowing to the tip, where there is a small cylindri pendage, which appears to be the maxillary palpus, forme single great joint, united to the maxilla by a small and soft ring, which, judging by analogy from the antennæ and the palpi, may be the first joint of the maxillary palpus. other end there is also a soft white convex surface, which as though divided by a circular impression in the middl two joints—a small circular one in the centre, and a larger a one around it. If we look upon these two white parts of of this curious maxillary palpus as two different joints, the p including the white ring at the base, will be four-jointe usual in Coleopterous larvæ. Behind this must have bee cealed the internal jaw of the maxillæ, which I did not se was much retracted in the interior of the mouth during t of the animal, and I was not able to make a better exami after the death of the creature, having unfortunately lost it

The smaller piece between the two trunks of the max the mentum of the under lip, a triangular scale, with the p end behind, and the base in front. At this end are at the three-jointed labial palpi, and between them the very oval tongue or ligula. Each palpus has, like the ant a soft white basal joint, and two slender horny joints, th being a very thin point at the end of the palpus. The ligu

as I had preserved the animal living in my room under a dr
glass. This light, which the animal can intensify or dimi
will, was of two different colours.

At the head is emitted an entirely red light, like a l
coal; but on thebody the light was greenish white, like
the glowworm, or of phosphorus. Sometimes, when the
had been disturbed, the light was so strong that I could
the whole figure of the animal perfectly well during the n
I took it in my hand and looked at it through a lens. I t
served that the light of the body was not homogeneous, l
arranged in ten points of light on each side of the body,
sponding to the incisions between the segments. I saw
small luminous spot behind the dorsal plates in the so
connecting them. The segment behind the head and th
ceding the anal tube, both which are covered with un
horny plates, had no luminous points; but the connectin
between the head and the next segment also emitted a
red light. By this arrangement of ten luminous points
side of the larva, when seen from a little distance on
night it appears as twenty small points of greenish-white
of the size of the head of a strong pin, arranged in two p
rows, and following a larger point of red light placed ce
in front of the two rows.

This larva lived for some days in my room, amongst
of rotten wood, but did not feed or change to the ch
state: it was lost through the negligence of my servan
took the glass from the table to clean it; so I am perfec
acquainted with the imago it would have produced.

Having regard to the general figure of this larva, mor
cially to the configuration of the head and the oral organs,
no doubt that it belongs the light-giving genus *Pyro*
of the family *Elateridæ*. The larvæ of this group of Cole
have the same general form, the cylindrical or oval-cylin
body (whence some have acquired the familiar name of
worms), and generally the stronger horny skin and the sam
struction of the mouth; especially the peculiar form of the t
of the maxillæ united with the mentum agrees perfectly
these organs in the luminous larva in question.

Many larvæ of this family have been well described and f
by Bouché, Lequin, Perris, Westwood, and others (*see*
daire, Hist. Nat. des Coléoptères, tom. iv. p. 134), all ag

in the principal characters which I have here described from my luminous larva. As the only luminous insects which occur in this country belong to the *Pyrophori* and *Lampyridæ*, I feel tolerably certain that this larva belongs to *Pyrophorus*, because the larvæ of *Lampyridæ* have a broader, softer, and flatter body, and their oral parts must be smaller, at least in those of this country, none of which exceeds an inch in length. But the largest *Pyrophorus* from the Argentine Republic (*P. punctatissimus*, Bl. Candèze, Monog. iv. p. 17) is 1¼ inch long, and bears the same proportion to my larva that the large larva of *Agrypnus fuscipes*, described by Lequin, bears to the imago-state of *Anthia sexguttata*, (Guérin, Mag. de Zool. 1832, ix. 41). Indeed this larva has many points of resemblance to the larva here described; but it belongs to another group of the *Elateridæ*, in which the larva has the anal tube retracted and covered by the preceding elongated segment, which bears the form of a strong denticulated horny fork.

My larva agrees with others of the same family in the projecting anal tube and the unarmed preceding segment, like that of *El. sanguineus*. Erichson mentions a larva of *Pyrophorus* from Cuba (Wiegmann's Archiv, 1841, tom. i. p. 87), and says that the body is softer, more fleshy, and the segments are more separated —characters which agree very well with the construction of my larva; but he also mentions that the last segment bears many small humps, which I certainly did not notice in my specimen. This may, indeed, be a specific character, and not a generic one.

The conclusion at which I have arrived is therefore this— that the luminous larva observed by Azara, Ogilvie, and myself is that of *Pyrophorus punctatissimus*.

With reference to Mr. Murray's *Astraptor illuminator*, it appears to me not to be a larva of one of the *Elateridæ*, but rather to be that of one of the *Lampyridæ*. The figure given of the mouth shows none of the characters of a larva of *Elateridæ*, but agrees far better with the structure of the larva of the *Lampyridæ*. This view is also supported by the retracted head, the depressed form of the body, the sharp lateral margin, and the distinctly separated segments, which form, on each, projecting angles before the union with the adjoining segment; all these are characters distinctive of the *Lampyridæ* larvæ.

Buenos Ayres, April 25, 1871.

On the Origin of Insects. By Sir JOHN LUBBOCK, Ba

[Read November 2, 1871.]

THE metamorphoses of this group have always seemed to
of the greatest difficulties of the Darwinian theory. In mo
the development of the individual reproduces to a certain
that of the race; but the motionless, imbecile pupa canno
sent a mature form. Fritz Müller considers that the w
Blattidæ probably most closely represent the original
stock; Häckel is inclined rather to the Pseudo-Neuropt
feel great difficulty in conceiving by what natural pro
insect with a suctorial mouth like that of a gnat or b
could be developed from a powerfully mandibulate type l
Orthoptera, or even from the Neuroptera. M. Brauer l
cently suggested that the interesting genus *Campodea* is,
known existing forms, that which probably most nearly re
the parent insect stock. He considers that the grub f
larva is a retrograde type, in which opinion I am un
concur, though disposed to agree with M. Brauer on th
point. M. Brauer, in coming to this conclusion, relies
on geological considerations, partly on the fact that
more or less resembling *Campodea* occur among widely di
groups of insects. I think there are other considerations
offer considerable support to this view. No one, so fa
know, has yet attempted to explain, in accordance wit
Darwin's views, such a life-history as that, for instance
butterfly, in which the mouth is first mandibulate and th
torial. A clue to the difficulty may, I think, be found
distinction between developmental and adaptive changes, to
I called the attention of the Society in a previous memoir
larvæ of insects are by no means mere stages in the develo
of the perfect animal. On the contrary, they are subject
influence of Natural Selection, and undergo changes which
reference entirely to their own requirements and conditio
is evident, then, that, while the embryonic development
animal in the egg gives an epitome of its specific history,
by no means the case with species in which the immature
have a separate and independent existence. Hence, if an
when young pursues one mode of life, and lives on one k
food, and subsequently, either from its own growth in siz
strength, or from any change of season, alters its habits o

is true that in *Chloëon* the vibration of the so-called branchiæ is scarcely, if at all, utilized for the purpose of locomotion; the branchiæ are, in fact, placed too far back to act efficiently. The situation, however, of these branchiæ differs in different groups; indeed it seems probable that originally there would be a pair on each segment. In such a case those branchiæ which were situated near the centre of the body, neither too much in front nor too far back, would serve the most efficiently as propellers. The same causes which have determined the position of the legs would affect the wings also. Thus a division of labour would be effected; the branchiæ on the posterior segments of the thorax would be devoted to locomotion, those on the abdomen to respiration. This would tend to increase the development of the thoracic segments, already somewhat enlarged to receive the muscles of the legs.

That wings may be of use to insects under water is proved by the very interesting case of *Polynema natans*, which I discovered in 1862, and which uses its wings to swim with. This, however, is a rare case; and it is possible that the principal use of the wings was, primordially, to enable the mature forms to pass from pond to pond, thus securing fresh habitats and perhaps avoiding in-and-in breeding. If so, the development of wings would tend to be relegated to a late period of life; and by the tendency to the inheritance of characters at corresponding ages, to which Mr. Darwin has called attention*, the development of wings would be associated with the maturity of the insect. Thus the late acquisition of wings in the Insecta generally seems to be itself an indication of their descent from a stock which was at one period aquatic in its habits, and which probably resembled the present larvæ of *Chloëon* in form, but had thoracic as well as abdominal branchiæ.

If these views are correct, the genus *Campodea* must be regarded as a form of remarkable interest, since it is the living representative of a primæval type from which not only the Collembola and Thysanura, but the other great orders of insects have all derived their origin.

* Origin of Species, 4th ed. pp. 14 & 97.

not positively affirm that in that bivalve, or, indeed, in *Unio* or *Anodon*, the pearls arise from the same exciting cause, although in the last two genera we have found them together. We are not certain what is the early life-history of the distomes; but in *Unio* the foot is sometimes found distended with capsules or mother cells, each one containing several distomes.

The above account of the matter the writer gave at one of the Meetings of the British Association, at least the principal facts; and he is not aware that it has ever been contravened. He would now proceed a little further in the subject, with a utilitarian aim.

Attempts have been made to force the mollusks to produce these pearls at the will of the experimenters. And, first, might not the *Alasmodon* of our rivers be cultivated like the salmon, so as to become more plentiful and possibly more entitled to its name *margaritiferus*?—many gravelly and rapid streams (the Dove, for instance, in its upper course) being apparently well suited for it, and having neither this species nor any of its representatives. Secondly, it has been supposed that a morbid state of the animal is more favourable to the production of pearls, or, in our view, more favourable to the generation of the distomes; and could not that be brought about by a transfer, or some such contamination of the water as the Chinese are said to practice? Thirdly, could not the *Alasmodon* be forced to form pearls by carefully introducing foreign bodies between the mantle and the shell, not as Linnæus is said to have done, by breaking or boring the shells, but by prizing them a little open and so introducing such bodies? The people just alluded to, we should suppose, so introduced the metallic or shelly nuclei, thus producing the well-known pearly excrescences resembling Buddha, as well as large pearls. We have had no opportunity of operating on the *Unio* or *Alasmodon*, though they may be kept alive for a long time under a tap; but we have made a few trials on the common *Anodon*, and present the specimens. Our plan was to prize open the valves a little, separate the mantle from the valves, and then introduce *several pearls from the common Mytilus*, in the hope that they would become coated with a layer of brighter nacre. In two months the pearls had become adherent to the shells—and in three, more or less increased by coats of nacre. As I before said, with the true British pearl-mussel I have not been able to make the trial. Réaumur and Linnæus seem to have failed with experiments of this kind; but other trials might be more successful,

Rolleston, I think, was the first to ascertain. In the depth of the foot of the *Anodon*, at some distance before and below the pedal ganglion, is a little yellowish-brown body about the size of a mustard-seed, of a waxy consistence and formed of several *convolutions*. We should consider this to be a rudiment of a byssus-gland rather than of the organ of hearing. There is also a curved band of yellowish thickened mantle below the hinge, which requires explanation.

Note on a Chinese Artichoke Gall (mentioned and figured in Dr. HANCE's paper "On Silkworm-Oaks") allied to the European Artichoke Gall of *Aphilothrix gemmæ*, Linn. By ALBERT MÜLLER, F.L.S.

[Read February 15, 1872.]

FROM the valuable "Supplementary Note on Chinese Silkworm-Oaks," by Dr. H. F. Hance (Journ. Linn. Soc. Botany, vol. xiii. No. 65) I select for consideration the following passages, which are of special interest as affording the first intimation of the occurrence of a cynipideous oak-gall new to science :—

"The larger trees, producing acorns, are called *Siang-li* (the generic name for the oak), whilst those that are smaller and do not produce acorns are called *Ts'ing-kang*. In its stem and foliage the *Ts'ing-kang* is altogether similar to the *Siang-li*; but the colour of its leaves is a lighter green, and its flowers less abundant" (p. 9). . . . . "The *Ts'ing-kang* tree grows on hills interspersed with the *Tsiang-li* oak trees, being in fact of the same kind, but devoid of flowers and fruit. A green ball is frequently found developed at the extremity of its twigs, consisting of hairs as fine as the silky fibres of the *Tsung* tree (qu. a palm?), but somewhat tougher. . . . . The plate annexed to the above description, a copy of which is here [*vide* p. 11] given, represents an oak with leaves like those of a shallow-lobed form of *Quercus robur*, and with three fruits (unless they are intended for the 'oak-apple' mentioned in the text), one distinctly stalked, the dense squamæ of the cupule entirely concealing the acorn, and looking like those of *Q. dentata*, Thunb., though closely appressed instead of being more or less reflexed" (p. 10).

"The oaks are never allowed to grow old here [Thong-kin-foo]; every eight or nine years they are cut down to the ground; the subterranean trunks throw up new shoots, which are again cut down after the lapse of another eight or nine years, so that the oak woods are merely copses" (p. 12).

Britain and China lie far apart; but, botanically speaking, the genus *Quercus* is a good link between the two countries. It is therefore worth while pointing out that with the aid afforded by the life-history of a British *Cynips* the extracts given above bear witness to the existence of a closely allied Chinese insect. What my friend Mr. Riley, the State entomologist of Missouri, properly styles "unity of habit," points out the way. Since it has come to pass in Britain and on the continent adjoining that oaks are felled wholesale, and are almost everywhere replaced by copsewood, which has sprung up from their roots, an axillary excrescence called, from its resemblance to an artichoke, the "Artichoke Gall" has made its appearance in enormous numbers on the young oak-shoots. It is the cradle of a cynipideous fly named *Aphilothrix gemmæ*, Linn. (*Cynips fecundatrix*, Hartig). The numbers of this insect in Britain are now so great in some parts that they threaten to render many bearing oak trees altogether sterile. The parasitic Hymenoptera appointed to keep this *Cynips* in check are now altogether insufficient in numbers to cope with its rapid increase

egg or very young larva, the acorn remains very small (seed-like), and but seldom preserves its normal shape.

Réaumur knew these galls, and has described and figured them (Mémoires, t. iii. p. 463, tab. 43 & 44), and has been followed by numerous other observers; but I have ventured to refer to my own observations in preference, so as to bring out the salient points between the European and the Chinese species. I dismiss the notion of calling this latter gall an "oak-apple;" the two productions have not the slightest resemblance.

Turning now to its affinities with the "*galle en artichaut*" of Réaumur, I venture to call attention to the following points.

European form.	Chinese form.
On *Quercus pedunculata*, *sessiliflora*, and *pubescens*; prefers young copsewood and stunted trees.	On "*Ts'ing kang*," an oak with light-green leaves, in outline like those of a shallow-lobed form of *Q. robur*; on trees kept artificially in the copse-state.
Exceedingly common. Axillary, sometimes at extremity of twigs. Shape of an artichoke or foliaceous	"Found frequently developed." At extremity of twigs. "Green ball," but figured as a foliaceous cone.

European form.	Chinese form.
cone. Colour, first green, then brown. Sometimes stalked.	“One distinctly stalked.”.
Dense squamæ, representing converted cupule; generally concealing the acorn.	“Dense” squamæ (“of the cupule”?) entirely concealing the acorn. (No cupule is visible in the figure.)
Squamæ closely appressed in the earlier stage of growth, less so when mature.	Squamæ looking like those of *Q. dentata*, Thunb., though closely appressed, instead of being more or less reflexed. (The figure does not show them closely appressed.)
Acorn stunted, standing upright on a central axis. Acorn converted into a capacious larval cell, dropping to the ground in autumn.	No evidence. (No acorn visible in the figure.)
Insect. *Aphilothrix gemmæ*, Linn. (*Cynips fecundatrix*, Hartig).	Insect not known. *A Cynips*?

I have not taken any notice of the different Chinese localities whence the above facts were procured. The European *Cynips* has an extensive range; and its Chinese ally is not likely to be worse off in this respect.

It now behoves the residents on the spot to prosecute this inquiry; the naturalist at home has done his share by calling attention to the matter.

On the Geographical Distribution of the Diurnal Lepidoptera as compared with that of the Birds. By W. F. Kirby, Assistant in the Museum of the Royal Dublin Society, author of ‘A Catalogue of Diurnal Lepidoptera,’ &c.

[Read February 15, 1872.]

The preparation of my ‘Catalogue of Diurnal Lepidoptera’ has furnished me with materials for a paper on the general distribution of the group, which I have hitherto always shrunk from attempting. It happens that the number of species recorded slightly exceeds that of the number of birds as estimated by Dr. Sclater* in his paper “On the general Geographical Distribution of the Members of the Class Aves” (Journ. Linn. Soc. Zool. vol.

* Gray now enumerates upwards of 11,000 species; but it is more convenient to take Sclater's estimate in the present paper.

splendid tropical forms in size and brilliancy: but, on the other hand, the number of peculiar forms is considerable; and the tropical representatives of boreal genera by no means surpass those of temperate regions; and I have myself observed that on comparing Indian and European representatives of the same species the Indian specimens are generally smaller, owing probably to the more rapid development of the larvæ in a warmer climate.

With regard to the peculiarities of distribution within the limits of the Palæarctic region, we have, first, the Arctic fauna, which is practically circumpolar; next the central fauna, stretching through the vast plains of Central Asia-Europe, and in which we may also include the Alpine fauna. The bulk of the central species are bounded to the south by the Alps and Pyrenees; and hence the fauna of Spain is much poorer than that of France, and that of Italy than that of Austria. South of the Alps, in Europe, we find the Mediterranean fauna, which has several little groups peculiar to itself. There is probably a south-central steppe fauna in Central Asia; but too little is known of that region to enable us to say more than that it produces several peculiar forms of high interest, *e. g. Hypermnestra*. The south-east of Europe is much richer in species than the south-west; for there are fewer obstacles to the southern spread of the central fauna in that direction.

Still it is difficult to account for the much greater number of species in East-central than in West-central Europe.

The Alpine species are scarcely represented at all in the mountains of the extreme south of Europe; and not a single truly Alpine species is yet known to occur in the mountains of North Africa. The extrinsic elements of the Palæarctic fauna consist, first, of isolated Nearctic and Indian forms in Japan and Mantchuria (*Midea, Papilio*, &c.); second, of a few Indian forms in Eastern Europe (*Neptis, Danaus*, &c.); and, third, in a few African forms in South Europe and North Africa (*Charaxes, Callosune*).

It is very difficult to estimate the real number of known species occurring in the Palæarctic region, on account of the division between this and the Indian region intersecting China and the Himalayas; but they may be set down as about 630 * at a very moderate computation. Dr. Sclater gives the area of the Palæarctic region as 14,000,000 square miles, and the number of spe-

* Species occurring in more than one region are enumerated under both in this paper.

two species of *Hypanartia*, a Tropical-American genus, occur in Africa and Madagascar. South Africa is remarkably poor in species, and can hardly number more than 250. Most of the characteristic genera of Tropical Africa are entirely absent, or very poorly represented, though the number of species peculiar to Southern Africa is very considerable in proportion to the total. A summary of their geographical distribution is given by Mr. Trimen at the end of his 'Rhopalocera Africæ Australis.'

Dr. Sclater estimates the birds of the Æthiopian region at 1250 species, or one species to 9600 square miles: but here the deficiency of known butterflies is still more remarkable than in the Palæarctic region; for they do not number more than 733, or one species to 16,400 miles nearly. It must be remembered, however, that a very small proportion of Africa has yet been explored entomologically; but the small number of species known from the best-explored portion (South Africa) proves beyond a doubt that its Lepidopterous fauna is extremely poor, although the greater portion of the species belong to genera almost peculiar to Africa. The insects of Africa are also extremely uniform in character, the same genera and often the same species occurring in localities so widely removed as Sierra Leone, Mozambique, and Natal.

III. *Indian or Middle Palæotropical Region.*

"*Extent.*—India and Asia generally, south of Himalayas; Ceylon; Burmah; Malacca and Southern China; Philippines; Borneo; Java; Sumatra and adjacent islands: an area of perhaps 4,000,000 square miles."

Characteristic forms.—Zophoessa, Lethe, Neope, Cœlites, Zethera, Ragadia, Yphthima, Melanitis, Amathusia, Zeuxidia, Discophora, Enispe, Clerome, Æmona, Thaumantis, Cethosia, Cirrochroa, Cynthia, Junonia, Rhinopalpa, Kallima, Amnosia, Hestina, Euripus, Penthema, Lebadea, Limenitis, Neptis, Athyma, Euthalia, Tanaëcia, Symphædra, Apatura, Charaxes, Dodona, Taxila, Miletus, Allotinus, Ilerda, Sithon, Deudorix, Liphyra, Amblypodia, Tachyris, Prioneris, Dercas, Calinaga, Teinopalpus, Leptocircus, Taractrocera, Tagiades.

By far the richest district in the world, except South America. The principal characteristic forms are enumerated above; and these are almost, if not entirely, confined to the Indian region, though several have outlying representatives in Celebes alone—

Dr. Sclater estimates the birds of the Australian region at 1000, or one species to every 3000 square miles; the number of butterflies is 725, or one to every 4138 miles.

V. *Nearctic or North-American Region.*

"*Extent.*—Greenland and North America down to centre of Mexico; area of perhaps 6,500,000 square miles."

Characteristic forms.—*Œneis* (circumpolar), *Grapta*, *Midea.*

The poverty of this region, as compared with every other, is most remarkable. Many of the characteristic forms of the Palæarctic fauna are absent in North America, although the Palæarctic region has representatives of every North-American genus except a few representatives of the characteristic forms of Southern America. The few genera mentioned above are the only ones in which the number of species is slightly greater than in the Palæarctic region.

While the number of birds in the Nearctic region is estimated at 660, or one in 9000 square miles, that of the butterflies is only 480, or not more than one in about 13,800 miles. It thus appears that though North America has so few characteristic forms, yet it is richer than the Palæarctic region in the number of its species as compared with its extent. It must be remembered, however, that this is owing partly to the sameness of the Palæarctic region, and partly to the European fauna being better known than the American, and to the slighter characters on which species are established by American Lepidopterists: 300 good species occur in Europe alone; and it may well be doubted whether America, east of the Rocky Mountains, produces more. California and Chili, though the former is necessarily included in the Nearctic and the latter in the Neotropical region, do not really belong to them, but are rather to be regarded as outlying portions of the Palæarctic region, many Palæarctic forms being represented in the New World in these districts only.

VI. *Neotropical or South-American Region.*

"*Extent.*—West-India islands, Southern Mexico, Central America and whole of South America, Galapagos Islands, Falkland Islands; estimated area of about 5,500,000 square miles."

I have found it expedient to credit the Neotropical region with the whole of the Mexican *Rhopalocera*; for all the described species, with very few exceptions, if we omit the species common to

All the great cosmopolitan genera, such as *Papilio*, *Pieris*, *Eurema*, &c., are represented in South America by whole groups often of so much importance that they ought rather to be reckoned as genera than groups. Again, many genera, like *Apatura* and *Thecla*, which do not extend to Africa, are abundantly represented; while, on the other hand, *Catopsilia* and *Danaus*, almost purely tropical genera in the Old World, send out offshoots far into the United States. This, however, is a parallel case to the occurrence of Indian forms in Mantchuria, which in the west and centre of Asia-Europe are purely tropical.

The Neotropical region is far richer in Rhopalocera than in birds. Dr. Sclater estimates the birds at 2250 species, or one to each 2400 square miles; but the number of Rhopalocera already known is not less than 4200, which is about equivalent to a species to each 1310 miles. Nor is it likely that this enormous number would be materially affected by the uncertainty as to how much of Mexico should be included in the Neotropical region, as the greater part of the Mexican species are found in South America also.

I have not added a comparative Table of the number of birds and butterflies in each region, as there are a considerable number of species of the latter of doubtful locality not included in my summary, and this can be better done when future discoveries have enabled us to check the rough results already arrived at in a more perfect manner than is possible at present with our existing materials.

[The following Table was prepared to illustrate the reading of Mr. Kirby's paper, and is therefore added here.—H.T.S.]

	Birds.	Butterflies.
Total number of species	7500	7700
Europe, North Asia, Persia, Asia Minor and North Africa.........	650	630
Africa, Central and Southern, Madagascar, &c.	1250	733
India and Indian archipelago	1500	1250
Australia	1000	725
North America........................	660	480
South America	2250	4200

The female has only the slightest vestiges of spines on the elytra. A nearly allied species from Aru is without the raised lines on the alternate interstices.

Ottistira bicornis. *O.* picea, dense griseo-squamosa, fusco nebulosa; rostro longiore; antennis subtestaceis; clava fusca, griseo-tomentosa, modice elongata; prothorace latitudine paulo longiore, utrinque pone medium paulo incurvato, sat confertim punctato, dorso subbivittato; elytris magis ampliatis, humeris obliquis, fortiter striato-punctatis, punctis approximatis, postice spinis duabus validis obliquis armatis; interstitiis tertio postice, quinto septimoque basi elevatis; pedibus anticis majusculis; tibiis anticis validis, arcuatis, intus basin versus longe pilosis, tibiis intermediis breviusculis. Long. 3 lin.

Hab. New Guinea.

I have only a single example of this species, which is very distinct from the preceding, having proportionally a larger prothorax, more closely punctured elytra, and very strong fore legs.

Ottistira planidorsis. *O.* ovata, subtestacea, squamis griseis fuscisque dense tecta; capite inter oculos ad basin rostri breviter canaliculato; antennis testaceis, apicem versus infuscatis; articulis ultimis funiculi transversim subturbinatis; clava ovali, vix elongata; prothorace sat remote punctato, fusco bivittato; elytris dorso planatis, fortiter sulcato-punctatis, punctis remotis, interstitio quinto postice sensim elevato, apice rotundatis; corpore infra minus squamoso; tibiis arcuatis, posticis rectis. Long. 2 lin.

Hab. Batchian; Amboyna.

Well differentiated by the flatness of the elytra above, which is limited on each side by the elevated fifth interstice.

Ottistira ocularis. *O.* ovata, picea, squamis griseis fuscescentibusque tecta; capite rostroque angustioribus, hoc haud sulcato; oculis antice approximatis; antennis testaceis; clava sat breviter ovali; prothorace latitudine longitudini æquali, sat leviter punctato; elytris anguste subcordatis, sulcato-punctatis, punctis linearibus, interstitiis modice convexis; tibiis anticis et intermediis arcuatis, posticis intus flexuosis. Long. $1\frac{1}{2}$ lin.

Hab. Singapore.

The eyes are larger in this species, and only separated in front by a comparatively narrow space.

Ottistira pulchella. *O.* ovata, picea, squamis flavo-virentibus fuscescenti figuratis tecta; capite rostroque brevibus; oculis lateralibus; antennis fulvo-testaceis; funiculo breviusculo; clava breviter ovata; prothorace parum transverso, apice quam basi paulo angus-

quam latiore, sat vage punctato, lateribus viridulo; elytris subcordatis, sulcato-punctatis, interstitiis modice convexis, punctis viridi-marginatis; corpore infra viridi-squamoso; pedibus fuscis, griseo-squamosis. Long. 2–2½ lin.

Hab. Tondano.

CYRTOZEMIA.

(Otiorhynchinæ.)

Rostrum mediocre, basi transversim sulcatum; *scrobes* terminales, foveiformes. *Antennæ* tenues; *scapo* filiformi, apice clavato; *funiculo* articulo primo secundo triplo longiore, cæteris modice elongatis, gradatim brevioribus, ultimo clavo continuato, hoc elongato. *Oculi* rotundati, modice prominuli. *Prothorax* transversus, subcylindricus, basi apiceque truncatus. *Elytra* ovalia, basi prothorace haud latiora. *Femora* in medio incrassata, mutica; *tibiæ* arcuatæ; *tarsi* subæquales; *unguiculi* connati. *Coxæ* posticæ valde distantes. *Metasternum* longiusculum. *Abdomen* segmentis tribus intermediis subæqualibus. *Processus* intercoxalis latissime truncatus.

A genus allied to *Laparocerus*, remarkable for the widely separated posterior coxæ and consequently great breadth of the intercoxal process, and in other respects differentiated from it by the longer metasternum, the transverse basal groove of the rostrum, marking it off from the head, and the short foveiform scrobes. The tibiæ of the female are only very slightly curved.

CYRTOZEMIA DISPAR. (Pl. X. fig. 9.) *C.* oblongo-ovata, nigra vel fusca, sparse pubescens; rostro capite sesquilongiore, in medio tenuiter carinulato; prothorace utrinque paulo rotundato, supra confertim granulato; scutello parvo, triangulari; elytris ovalibus, striato-punctatis, punctis subquadratis, approximatis, interstitiis convexis, ♂ interstitio sexto excavato lateribusque, magis dense pubescentibus; corpore infra sparse squamuloso; metasterno, segmentoque primo abdominis (in utroque sexu) excavatis; pedibus longe pilosis; tibiis posticis apice pilis albidis dense fimbriatis. Long. 3¼–3½ lin.

Hab. India (Bombay).

PSIDIOPSIS.

(Otiorhynchinæ.)

Rostrum mediocre; *scrobes* breves, terminales, postice evanescentes. *Antennæ* longæ, tenues; *scapo* curvato, apice solo incrassato; *funiculo* articulis elongatis, primo longiore; *clava* distincta,

Rostrum mediocre, capite continuatum, in medio tenuius; *scrobes* subapicales, supernæ, cavernosæ, postice cito evanescentes. *Oculi* rotundati, parum prominuli. *Antennæ* elongatæ, *scapus* rectus, ad marginem anteriorem prothoracis extendens; *funiculus* articulis duobus basalibus longioribus, cæteris obconicis; *clava* distincta. *Prothorax* transversus, utrinque rotundatus, basi truncatus. *Scutellum* nullum. *Elytra* ovata, humeris obsoletis. *Pedes* mediocres; *femora* incrassata; *tibiæ* intus flexuosæ; *tarsi* normales; *unguiculi* liberi, approximati. *Abdomen* segmentis 3–4 brevibus.

In the Australian fauna this genus may be placed between *Merimnetes* and *Myllocerus*; it has the rostrum of the former, but the free claws of the latter, from which it also differs in the straight scape, as well as from all the *Myllocerus* forms in the absence of the humeral angle. The second species here described has a very short metasternum; but I cannot find any other valid distinction of generic importance.

TELENICA SUBLIMBATA. *T.* ovata, nigra, sejunctim griseo-squamosa; rostro capite fere duplo longiore; antennis, tibiis tarsisque subferrugineis; prothoracis basi apice valde latiore; elytris indistincte seriatim punctatis, interstitiis planatis, uniseriatim setosis, pone medium fascia semilunari subfusca notatis, lateribus minus squamosis; metasterno longiusculo; corpore infra castaneo, squamis albis adsperso. Long. 1¾ lin.

Hab. West Australia.

TELENICA NEBULOSA. *T.* breviter ovata, nigra, argenteo fuscoque squamosa; rostro capite fere duplo longiore; antennis subferrugineis; prothorace basi minus latiore, indistincte vittatim fusco-vario; elytris brevibus, supra subdepressis, dorso, regione suturali excepta, fusco nebulosis, hac lateribusque subargenteis; tarsis ferrugineis; metasterno brevissimo. Long. 1¼ lin.

Hab. West Australia.

ONYCHOPOMA.

(Otiorhynchinæ.

Cum *Drepanodere* congruit sed *scapo* arcuato, dilatato, compresso, et *oculis* rotundatis.

The rostrum in the species described below, which varies considerably in coloration, is broad, shorter than the head, and transverse. The peculiarity of the genus lies in the dilated scape.

ONYCHOPOMA PARDA. (Pl. X. fig. 8.) *O.* oblongo-ovata, fusca, squamis griseis, plus minusve fusco-interruptis, vestita; rostro late transverso, supra manifeste tricarinato; scapo sat dense squamoso, quam funiculo longiore, hoc articulis quinque ultimis obconicis; clava breviter ovata; prothorace sat valde transverso, utrinque in spinam laminiformem, apice oblique truncato, producto; scutello rotundato; elytris tenuiter punctatis, punctis linearibus, supra fusco, vel aliquando fere obsolete, maculatim variegatis; corpore infra pedibusque griseo-squamosis; femoribus subtus dente parvo instructis. Long. 3 lin.

Hab. Cochin-China; Pegu.

TIMARETA.

(Otiorhynchinæ.)

Rostrum breve, antice planatum, modice arcuatum, basi haud sulcatum; *scrobes* laterales, profundæ, ampliatæ, oculos attingentes. *Antennæ* medianæ; *scapus* elongatus, gradatim incrassatus; *funiculus* 7-articulatus, articulis duobus basalibus, tribus ultimis

ACANTHOTRACHELUS ALBUS. *A.* subanguste ovalis, niger, squamulis albis dense vestitus, setulis numerosis interjectis; antennis nigris, sat dense albo-pilosis; oculis minusculis; prothorace valde transverso, postice paulo gradatim latiore, basin versus dente tenuato armato, basi ipsa fortiter bisinuata; scutello minuto; elytris elongato-subcordatis, basi prothoracis vix latioribus, seriatim oblongo-punctatis, apicibus rotundatis; corpore infra pedibusque albo-squamulosis. Long. 3½ lin. (rost. incl.).

Hab. Malabar.

The only other described species of this genus (*A. ventricosus*, Boh., from the Neilgherries) is differently coloured, and has the elytra shortly ovate and subglobose. I have another species from Rangoon.

DYSTIRUS.

(Leptopinæ)

Rostrum robustum, angulatum, versus apicem incrassatum; *scrobes* arcuatæ, infra et ab oculis desinentes. *Scapus* breviusculus; *funiculus* 7-articulatus, articulis quinque ultimis transversis, subæqualibus; *clava* adnata. *Oculi* ovati, liberi, infra acuminati. *Prothorax* transversus, utrinque calloso-dilatatus, lobis ocularibus distinctis. *Scutellum* invisum. *Elytra* ovata, prothorace haud latiora, angulis anticis obsoletis. *Femora* modice incrassata; *tibiæ* rectæ, posticæ corbulis cavernosis; *tarsi* articulis tribus basalibus apice utrinqne spinoso-productis, infra indumento squamoso vestitis; *unguiculi* liberi. *Abdomen* segmentis tribus intermediis æqualibus.

This genus appears to me to be most allied to the Australian *Leptops*, its chief differential character lying in the remarkable form of the prothorax, and the club closely attached to the funicle; the elytra also have no projection or tooth at the shoulder as in *Leptops*.

DYSTIRUS STRUMOSUS. (Pl. XIII. fig. 10.) *D.* niger, ubique indumento squamisque griseis, unguiculis nitide nigris exceptis, tectus; rostro capite fere duplo longiore, supra longitudinaliter fortiter trisulcato; antennis squamosis, funiculi articulo primo breviter obconico, secundo breviore, clava articuloque ultimo funiculi nigris, pilosis; prothorace irregulariter grosse foveato, interspatiis callosis; elytris fortiter sulcato-punctatis, interstitiis modice convexis; corpore infra pedibusque squamis piliformibus adspersis. Long. 5 lin. (rost. incl.).

Hab. Mexico.

EUOMUS RETUSUS. (Pl. XIII. fig. 12.) *E.* oblongo-ovatus, niger, squamis (vel squamositate) umbrinis omnino dense tectus; rostro profunde sulcato, basi tuberculis oblongis instructo; funiculo subtenuato, articulo secundo quam primo duplo longiore; prothorace latitudine longiore, fortiter granulato, medio sulcato, lateribus angulato-tuberculato, lobis ocularibus valde productis; elytris oblongis, a basi ad apicem gradatim amplioribus, postice subito declivibus, subseriatim tuberculatis, singulis tuberculis in seriebus duabus elevatis, posterioribus majoribus instructis; pedibus nigro-setosis. Long. 5 lin.

Hab. West Australia.

One of the most distinct species of the genus, on account of the outline of the elytra.

DIALEPTOPUS SERRICOLLIS. *D.* ♀ oblongo-ovalis, niger, capite rostroque sat dense albo-squamosis; hoc latitudine vix sesquilongiore, antice bicarinato; antennis nigris; prothorace sat oblongo, fere esquamoso, cristis dorsalibus lateralibusque tuberculis conicis, apice plerumque setis duabus coronatis, munitis; elytris ovatis, dorso esquamosis, tuberculis rubris conicis in seriebus duabus, singulis sex constitutis, apice sat late rotundatis, lateribus granulato-punctatis, sat dense albo-squamosis; corpore infra pedibusque castaneis, his nigro-setosis. Long. 6 lin.

Hab. Western Australia.

The male is probably narrower, or with parallel elytra, as in its congeners. This species is well differentiated by the small but prominent tubercles on the crests and sides of the prothorax, the latter appearing as if crenate or serrate. The tubercles on the elytra in the species of this genus can only be depended on approximately; occasionally one side has one more than the other.

DIALEPTOPUS GRANULATUS. *D.* ♀ oblongo-ovalis, niger, esquamosus, setulis tenuissimis ubique adspersus; rostro latitudine vix longiore, supra scrobes elevato; antennis piceis, breviusculis, clava brevi; prothorace haud cristato, apice valde producto, dorso granulato, utrinque angulatim dilatato, in medio lineatim longitudinaliter sulcato, lateribus infra vage tuberculato; elytris ovatis, supra versus basin granulatis, tuberculis conicis nigris in seriebus duabus, interiore tribus, exteriore sex, constitutis, apice sat late rotundatis, ad suturam submucronatis, lateribus rude granulato-punctatis; tarsis minus elongatis, linearibus. Long. 7 lin.

Hab. Western Australia.

DIALEPTOPUS PLANTARIS. (Pl. XII. fig. 11.) *D.* ovatus, niger, supra indumento incano tectus, squamulisque subtilissimis silaceis adspersus; rostro latitudine paulo longiore, vix carinato, antice utrinque uniseriatim punctato; antennis ferrugineis, clava ovali; protho-

æqualibus, fasciculisque plurimis e setulis erectis formatis, munitis; femoribus sparse setosis, tibiis setulis curvatis seriatim instructis. Long. 3 lin. (rostr. incl.).

Hab. Nicaragua (Chontales).

OPHRYOTA.

(Rhyparosominæ.)

Caput exsertum, fronte planatum, supra oculos cristatum; *rostrum* crassum, apicem versus sensim angustius; *scrobes* flexuosæ, obliquæ, ab ore usque infra oculum currentes. *Oculi* minusculi, ovati, laterales. *Antennæ* subapicales; *scapus* oculum attingens; *funiculus* 7-art., articulo primo ampliato, secundo breviter obconico, cæteris transversis, ultimo clavam arcte applicato. *Prothorax* ampliatus, apice productus, lobis ocularibus nullis. *Scutellum* distinctum. *Elytra* prothorace manifeste latiora, lateribus parallela. *Pedes* mediocres; *femora* modice incrassata; *tibiæ* rectæ, apice mucronatæ; *tarsi breves*, articulis tribus basalibus latitudine æqualibus, tertio subbilobo; *unguiculi* simplices, divaricati; *coxæ* anticæ contiguæ. *Pectus* apice integrum. *Metasternum* breve. *Abdomen* segmentis 3–4 brevibus.

This genus is allied to *Zephryne*, but is a stouter form, the club of the antennæ adnate to the funicle, the prothorax rounded, the metasternum short, &c. Mr. Masters tells me that it is found on the "Salt bush" in marshy places.

OPHRYOTA SQUAMIBUNDA. *O.* ovato-ampliata, picea, squamulis imbricatis murinis, umbrino plagiatis, dense tecta; capite inter oculos excavato, crista ad apicem rostri gradatim minus elevata, producta; rostro capite longiore, longitudinaliter gibboso, in medio sulcato; antennis squamulosis, setulis nigris adspersis; prothorace latitudine haud longiore, apice multo angustiore, rude subremote punctato, in medio leviter sulcato; elytris prothorace sesquilongioribus, ♀ magis latioribus, remote striato-punctatis, interstitiis convexis, alternis postice raro nodosis, apice late rotundatis, singulis plagis umbrinis quinque ornatis, *scil.* una basali macula prothoracis conjuncta, una obliqua ante medium, duabus pone medium fascias communes formantibus, una exteriore humerali; corpore infra pedibusque dense albido-squamulosis, his squamis longis interjectis; tarsis sparse nigro-setulosis; unguiculis testaceis. Long. 3 lin.

Hab. South Australia (Port Augusta).

PANTOREITES VITTATUS. *P.* rufo-brunneus, supra squamulis raris niveis, aliis condensatis vittas formantibus, vestitus; rostro piceo, squamulis adsperso; funiculo articulis secundo tertioque æqualibus; prothorace

Cechides.

(Hylobiinæ.)

Rostrum breve, crassum, capite continuatum; *scrobes* arcuatæ, subtransversæ, ab oculis remoti. *Antennæ* breves; *funiculus* quasi sex-, sed vere 7-articulatus, articulo ultimo ad clavam arcte applicato. *Oculi* rotundati, a prothorace valde distantes. *Prothorax* oblongus, subcylindricus, basi truncatus. *Scutellum* parvum, triangulare. *Elytra* prothorace multo latiora, oblonga, parallela. *Pedes* mediocres; *femora* modice incrassata, mutica; *tibiæ* arcuatæ, margine interiore dentes spiniformes gerente, apice unco transverso armatæ; *tarsi* normales; *unguiculi* divergentes. *Coxæ* anticæ contiguæ, intermediæ approximatæ. *Pectus* longiusculum, antice late marginatum. *Metasternum* elongatum. *Abdomen* segmentis 3–4 conjunctim brevioribus, sutura prima arcuata.

The short thick rostrum of this genus would seem scarcely to warrant its location among the Hylobiinæ, were it not for its obvious affinity to *Alphitopis*; indeed almost the only generic distinctions are this peculiarity and the distance of the scrobes from the eyes.

Cechides amœnus. (Pl. XII. fig. 7.) C. oblongus, sat angustus, niger, supra albo-plagiatim silaceo-squamosus, granulisque nitidis vage notatus, subtus pedibusque squamis albo-argenteis dense tectis; rostro capite breviore; antennis ferrugineis, squamosis, clava nigrescenti-tomentosa; prothorace utrinque paulo rotundato, basi quam apice paulo latiore, silaceo-subbivittato; elytris fere obsolete sulcatis, basi, apice fasciisque duabus silaceis irregulariter plagiatim decoratis. Long. 6¼ lin.

Hab. West Australia (Champion Bay).

Cycotida.

(Hylobiinæ.)

Rostrum cylindricum, modice tenuatum, paulo arcuatum, capite longius; *scrobes* obliquæ, infra rostrum desinentes. *Antennæ* præmedianæ; *scapus* sensim incrassatus; *funiculus* 7-articulatus, articulis 1–2 breviusculis, cæteris submoniliformibus; *clava* ovata, distincta, obsolete articulata. *Oculi* parvi, rotundati. *Prothorax* oblongus, subcylindricus, basi truncatus. *Scutellum* parvum. *Elytra* prothorace manifeste latiora, anguste elongato-

would probably have instituted a "groupe" for its reception. In its habit, I think, the genus approximates unmistakably to *Aoplocnemis*. There are apparently three species, differing principally in outline; but one of them is somewhat intermediate; so, for the present, I regard them as belonging to one variable form.

NEMESTRA INCERTA. (Pl. XII. fig. 5.) *N.* rufo-ferruginea vel nigra, albo- cervino- vel subaureo-squamosa; capite rostrique dimidio basali crebre punctatis, puncto singulo squama alba repleto, hoc basi triangulariter excavato, dimidio apicali minus punctato: antennis ferrugineis, griseo-pilosis; prothorace utrinque ampliato-rotundato, vel vix ampliato, dorso valde vel modice convexo, crebre punctato, inter puncta plus minusve granulato, medio lateribusque basi subaureo-squamoso; elytris prothorace multo latioribus, humeris valde productis, obliquis, sulcato-punctatis, interstitiis granulis depressis sat remote uniseriatim instructis, marginibus exterioribus densissime albo-squamosis; corpore infra dense argenteo-squamoso; pedibus minus squamosis. Long. 2¼–3½ lin.

Hab. West Australia (Fremantle).

NEDYLEDA.

(Erirhininæ.)

Dorytomo affinis, sed *tibiæ* anticæ rectæ, apice inermes; *coxæ* posticæ distantes; et *processus* intercoxalis late truncatus.

I follow Lacordaire in separating *Dorytomus*, Steph., from *Erirhinus*, Schön., principally on account of the absence of ocular lobes; and probably division will have to be carried still further, even for the European species. To the above characters it may be added that the eye is unusually narrow and distant about its own breadth from the prothorax, finely facetted, and the claws are approximate.

NEDYLEDA SEMIUSTA. (Pl. XII. fig. 9.) *N.* nigra, elytris, basi exceptis, nitide fulvo-ferrugineis; rostro prothorace breviore, fulvo-ferrugineo, basi nigro; oculis anguste ovatis, a prothorace modice distantibus; antennis fulvo-ferrugineis, clava nigra; funiculo articulo basali valido, secundo breviter obconico, cæteris transversis; prothorace transverso, crebre punctato, subalbido-squamoso; elytris late ovatis, seriatim punctatis, interstitiis latis, planatis: corpore infra nigro, sat dense argenteo-squamoso; femoribus, apice exceptis, nigris, tibiis tarsisque fulvo-ferrugineis, parce albo-pilosis. Long. 1½ lin.

Hab. West Australia.

This and most of the species from West Australia described in this paper were collected by Mr. Duboulay of Champion Bay.

forme. *Elytra* prothorace haud latiora, basi reflexo-marginata, postice gradatim angustiora, apicibus caudata. *Pedes* tenuati; *femora* elongata, sublinearia, infra dente parvo instructa; *tibiæ* subrectæ, apice intus mucronatæ; *tarsi* breviusculi, dilatati, articulo ultimo elongato; *unguiculi* liberi, divaricati. *Coxæ* anticæ sejunctæ. *Pectus* modice elongatum. *Abdomen* segmentis duobus basalibus ampliatis.

An isolated genus, but having a marked resemblance to *Ectinura* (*antè*, xi. Zool. p. 170), but in regard to the direction of the scrobes not to be referred to Hylobiinæ. It may be placed provisionally near *Aoplocnemis*, with which, however, I do not think it has much affinity. A few specimens were obtained by Mr. Buckley in his last expedition.

PELIOBIA GENICULATA. (Pl. XIII. fig. 3.) *P.* oblongo-angusta, nigra, squamosa, abdomine coxisque nitidis; capite inter oculos rude punctato; rostro piceo, prothorace sesquilongiore, basi et inter oculos fortiter carinato; antennis piceis, vage setosis; clava tomentosa; prothorace coriaceo, sparse nitide subgranulato, apice pallidiore, leviter emarginato; elytris basi depressis vel paulo excavatis, subtiliter seriatim punctatis, apicibus in processu conico valido terminatis; femoribus apice nitide rubris; tibiis intermediis et posticis apice extus setoso-marginatis. Long. 5 lin.

Hab. Ecuador (Macas).

BELUS ANGUINEUS. *B.* elongatus, subcylindricus, niger; rostro piceo; orbitis, linea in capite prothoraceque, et supra concinne maculatim niveo-squamosis; antennis nigris; prothorace longiore quam latiore, fortiter granulato; elytris ad apicem gradatim attenuatis, et paulo productis, ♂ pone humeros angustioribus, ad latera parum incurvatis, ♀ latioribus, lateribus parallelis, apicem versus minus elongatis; corpore infra dense niveo-piloso, maculis atris nudis notato. Long. 8–9 lin. (rostr. incl.).

Hab. West Australia (Nicol Bay).

Very like *B. irroratus*, Jek., but much narrower, especially the male, and the elytra slightly incurved at the sides.

BELUS APHTHOSUS. *B.* elongatus, subcylindricus, rufo-piceus, capite nigro, supra maculatim, subtus sat dense albido-pilosus; rostro prothorace sesquilongiore; antennis leviter pubescentibus; prothorace latitudine vix longiore, utrinque rotundato, confertim granulato, in medio subtiliter sulcato; elytris prothorace paulo latioribus, confertim rude punctatis, basi squamis magis condensatis, cæteris conspicue maculatis; lateribus perparum incurvatis, versus apicem cito angustatis, apicibus haud productis; corpore infra femoribusque sat dense albido-

subtilissimis parce adspersa, pectore abdomineque ad latera magis pilosis; rostro nitido, prothorace haud longiore; antennis apicem versus nigricantibus; prothorace ampliato-rotundato, valde convexo, confertim granulato-punctato, postice in medio longitudinaliter impresso; scutello transverso, longe albido-piloso; elytris prothorace haud latioribus, parallelis, apice rotundatis, crebre granulato-punctatis; femoribus anticis valde incrassatis. Long. 6 lin.

Hab. Western Australia (Nicol Bay).

This species is distinguished by its uniform coral-red colour when seen under a strong lens, and its more convex prothorax, without any, or with only a very fine trace, of the longitudinal ridges of nearly all its congeners.

Polydus.

(Ceratopodinæ.)

Rostrum subvalidum; *scrobes* subterminales, obliquæ, marginem anteriorem oculorum infra desinentes; *funiculus* articulis duobus basalibus longioribus, reliquis transversis, gradatim incrassatis; *clava* ovalis, distincta. *Oculi* transversi, grosse granulati. *Prothorax* transversus, basi bisinuatus, lobis ocularibus distinctis. *Scutellum* rotundatum. *Elytra* prothorace parum latiora, pygidium obtegentia, basi reflexo-marginata, apice obtuse rotundata. *Pedes* antici majores; *femora* valida, infra dentata; *tibiæ* compressæ, arcuatæ, sulcatæ, anticæ intus bisinuatæ; *tarsi* normales; *unguiculi* bifidi. *Mesosternum* dentatum. *Metasternum* breviusculum. *Abdomen* segmentis duobus basalibus modice ampliatis; *sutura* prima arcuata, cæteris rectis.

The exponent of this genus has much the habit of a *Læmosaccus*; but, except for the shorter and stouter rostrum, the characters given above show that it is a member of the Ceratopodinæ, and an interesting addition to that limited subfamily.

Polydus dumosus. (Pl. XIII. fig. 4.) *P.* breviusculus, rufo-fuscus, glaber, elytris rufo-brunneis; rostro prothorace parum longiore, paulo arcuato, omnino crebre punctato; antennis subtestaceis; funiculo breviusculo, articulo primo crassiore; prothorace fortiter transverso, utrinque rotundato, lineis obliquis subreticulatis munito; elytris subnitidis, leviter sulcato-punctatis, punctis remotis, interstitiis rugoso-granulatis: corpore infra pedibusque rufo-brunneis, parce griseo-pilosis, illo sat fortiter punctato; tibiis intermediis extus ad apicem dente obtuso instructis. Long. 3 lin.

Hab. Brazil (Bahia).

daire, aberrant, his formula being drawn up from five or six others coming from Java, India, and Ceylon*. Mr. Wallace found species in most of the islands he visited, from New Guinea to Singapore; and I have another from so far north as Japan. None have been found in Australia. A few only are here described. It is scarcely necessary to observe that the length of the rostrum varies more or less according to sex, and that an approximation is all that is attempted in the descriptions.

Acicnemis subsignata. *A.* præcedenti affinis, sed minus variegata; rostro quam capite prothoraceque conjunctis vix longiore; articulis funiculi multo brevioribus; prothorace omnino griseo, squamulis minus imbricatis, antice multo angustiore; elytris subparallelis, granulis vix nitidis, et, præsertim, tibiis brevibus. Long. 3 lin.

Hab. Madras.

Acicnemis peduncularis. *A.* oblongo-ovata, nigra, umbrino-squamosa, utrinque lineis duabus obliquis, alteraque pone medium elytrorum dense albo-squamosis: rostro quam dimidio corporis vix longiore, apice excepto, fortiter lineatim punctato; antennis ferrugineis; funiculi articulo secundo primo vix longiore, tertio obconico, cæteris moniliformibus, ultimo longiore; clava breviter ovata, basi fortiter pedunculata; prothorace oblongo-subconico, sat crebre profunde punctato, punctis squamositate repletis, utrinque albido-lineato; scutello triangulari; elytris cordato-trigonatis, seriatim foveatis, interstitiis postice elevatis, humeris lateribusque albo-lineatis, pone medium linea transversa, aliquando ad suturam interrupta, notatis; corpore infra pedibusque dense umbrino-squamosis, setulis albidis adsperso; tibiis posticis elongatis, intus obsolete bisinuatis. Long. 3 lin.

Hab. Singapore; Sarawak; Java.

The shortly ovate club abruptly pedunculate at the base is strongly characteristic of this species.

Acicnemis frenata. *A.* elliptica, nigra, umbrino-squamosa, utrinque lineis duabus albidis pone medium elytrorum currentibus ornata; rostro dimidio corporis haud longiore, ferrugineo, triente basali fortiter lineatim punctato, reliquo lævigato; antennis ferrugineis; funiculi articulo primo longiore, 3.–6. moniliformibus, 7. ovato, tomentoso, duobus præcedentibus conjunctim longitudine æquali; clava elongato-attenuata; oculis modice approximatis; prothorace oblongo, subconico; scutello nudo, cordato; elytris cordato-trigonatis, striato-punctatis, interstitiis planatis, singulis in medio macula semilunari nigra, postice albo-marginata, notatis; corpore infra squamis griseis sejun-

* M. Lacordaire has omitted to state that the scrobes are confluent beneath, although in some species there is a slightly elevated line between, not, however, really separating them.

Acicnemis brevipennis. *A.* breviter ovata, nigra, maculatim albo-squamosa; rostro, capite antice, tibiis tarsisque ferrugineis, illo dimidio corporis paulo breviore, et basi fortiter punctato; antennis breviusculis; clava brevi, ovata; prothorace ampliato-rotundato, convexo, crebre fortiter punctato; scutello minuto; elytris subglobosis, fortiter sulcato-punctatis, punctis singulis squama repletis, interstitiis sat latis, subplanatis; corpore infra femoribusque castaneis, illo sat confertim punctato. Long. 1–1¼ lin.

Hab. Batchian; Amboyna.

A short aberrant species, the femora long but less pedunculate; the intermediate and posterior coxæ more widely apart. The white spots are a little uncertain in their number, and occur chiefly on the anterior edge of the prothorax, and in a curved line behind the middle of the elytra.

Berethia.

(Menemachinæ.)

Ab *Acicnemide* differt *femoribus* brevioribus, haud vel vix pedunculatis, posticis corpus haud superantibus; *abdomine* sutura prima in medio obsoleta.

A modification of *Acicnemis*, but sufficiently distinct. The typical species has short stout posterior tibiæ, strongly bisinuate on the inner edge. The second species has much of the style of coloration of *A. pardalis*.

Berethia medinotata. (Pl. X. fig. 3.) *B.* oblonga, subplanata, nitide fusca, supra subnuda, infra femorumque basi dense albo-squamosa; rostro prothorace cum capite haud longiore, basi grosse crebre punctato; antennis subferrugineis, articulo secundo funiculi primo sesquilongiore; prothorace subtransverso, antice angusto, utrinque ad medium gradatim latiore, fortiter crebre punctato, punctis unisquamigeris; elytris prothorace multo latioribus, profunde sulcato-punctatis, interstitiis rugosis, apicibus mucronatis, sutura, apice excepto, nigris, macula media oblonga alteraque apicali, e squamis albis condensatis, notatis; tibiis tarsisque ferrugineis; illis albo-squamosis. Long. 3 lin.

Hab. Ceram.

Berethia sannio. (Pl. X. fig. 2.) *B.* oblonga, modice convexa, nigra, supra, femoribus tibiisque umbrino-squamosis albo nigroque variegatim notatis; rostro prothorace duplo longiore, apicem versus nitide subferrugineo, basi sejunctim griseo-squamoso; antennis subferrugineis, articulo secundo funiculi primo duplo longiore; prothorace latitudine parum longiore, sat crebre punctato, dorso albo bivittato; elytris leviter sul-

supra lineis ochraceis tribus, e squamis condensatis, triangulum longulum formantibus; rostro basi rude lineatim punctato, apice lævigato; antennis ferrugineis, scapo antemediano; funiculo articulis duobus basalibus breviusculis, æqualibus, cæteris moniliformibus, ultimo ampliato; clava breviter ovata; prothorace oblongo, sat remote foveato, in medio bifasciculato, utrinque vittato; scutello minuto; elytris basi prothorace vix latioribus et usque ad tertiam partem gradatim latioribus, deinde cito angustioribus, apice rotundatis, seriatim fortiter foveatis, postice sulcatis, interstitiis alternis elevatis, angulis fasciculis duobus nigris munitis; corpore infra nitide nigro, punctis, squamis ochraceis repletis, adsperso; pedibus parce griseo-setosulis. Long. 3½ lin.

Hab. Sarawak.

Cholus pulchellus. *C.* subrhombicus, ater, nitidus, sulphureo-plagiatus; capite rostroque castaneis, illo sat vage punctato; antennis testaceo-ferrugineis; funiculi articulo primo duobus sequentibus conjunctim longiore; prothorace sat vage tenuiter punctulato, limbo antice utrinque sulphureo-squamoso; scutello obsoleto; elytris obconicis, remote seriatim punctatis, interstitiis lævigatis, subtilissime sparse punctulatis, dorso singulorum cavitatibus tribus majusculis squamis sulphureis repletis concinne ornato, *scil.* una basali, una post

medium, altera apice approximata, et ad latera una media obsitis; corpore infra dense sulphureo-squamoso. Long. 3 lin.

Hab. Cayenne.

Allied to *C. Beschii*, Fhs., but, *inter alia*, with a finer and not deeply punctured prothorax, the punctate lines on the elytra more delicate and the intervals smooth. The next species differs also in sculpture, and in the manifestly shorter elytra. The three have the scutellum obsolete or nearly obsolete, and the spur on the anterior tibiæ much reduced *.

CHOLUS ÆMULUS. *C.* subellipticus, castaneus, nitidus, elytris magis rufescentibus, supra citrino-plagiatus; capite crebre punctato; rostro antennisque rufo-castaneis; funiculi articulo primo tribus sequentibus conjunctim æquali; prothorace sat vage tenuiter punctato, limbo antico utrinque citrino-squamoso; scutello obsoleto; elytris brevioribus, obconicis, minus remote seriatim punctatis, punctis majusculis, interstitiis in certo situ transversim corrugatis, cavitatibus plurimis squamis citrinis repletis ornatis, *scil.* tribus majoribus ut in præcedenti, tribus lateralibus et duabus antemediis minoribus; corpore infra citrino-squamoso; pedibus rufo-castaneis. Long. 2¾ lin.

Hab. Amazons.

* Lacordaire considers that the numerous species included by Schönherr in *Cholus* ought, for the most part, to be excluded, to form several new genera. While, however, it is very far from being homogeneous, I can find no sufficient characters by which the species can be satisfactorily distributed into genera. On the contrary, while there is absolutely nothing to separate *Polyderces*, it seems to me almost impossible in some cases to distinguish *Archarias* from *Cholus*, the former differentiated, according to Lacordaire, by the intermediate segments of the abdomen being angulated at the sides; and therefore I have not adopted either of those genera. Nevertheless, after an examination of most of Schönherr's species and a large number of new ones, several of which are here described, I think it will be desirable to limit the genus, somewhat arbitrarily it may be, as nearly as possible to such species as possess the following characters:—(1) eyes round or oval, (2) scape barely reaching the eye, (3) club of the antennæ distinct, (4) anterior coxæ more or less widely apart, (5) anterior tibiæ unguiculated as well as mucronate at the apex. As to the ocular lobes, they are certainly present in *C. albo-cinctus* and some others, and bordered with vibrissæ, which partly cover the eye, while in other species (*parcus*, *undulatus*, &c.) there is not a trace of them, the eye resting at some distance from the prothorax. The femora, too, almost invariably thickened in the middle, are linear in *C. cinctus*, which is closely allied to *C. albo-cinctus*, in which they are in the normal state; but they are always furnished with a well-marked tooth beneath. The mesosternum, sometimes strongly produced (*laticollis*, *viduatus*, &c.), is generally simple; and there are gradations between the two. The outline, whether rhombic or elliptic, or oval, and the serration of the elytra posteriorly are characters, as it seems to me, of only specific value.

mixtis, sejunctim vestitis; mesosterno elevato, antice verticali; femoribus leviter incrassatis. Long. 5 lin.

Hab. Para.

For the present this species will be best placed after *C. inornatus.*

Cholus nivosus. *C.* oblongo-ovatus, niger, nitidus, supra sparse niveo-squamosus, plurimis condensatis guttulas formantibus; rostro sat valde elongato, piceo; antennis piceis, clava ovata, acuminata; prothorace longitudine latitudini fere æquali, irregulariter punctato, interspatiis subtiliter transversim granulatis, utrinque niveo subvittato; scutello subscutiformi; elytris obovatis, transversim granulatis, guttulis numerosis notatis, apice crenatis; corpore infra pedibusque fusco-ferrugineis, illo niveo-squamoso, his squamis piliformibus dispersis. Long. 5 lin.

Hab. New Granada.

For the present this species may be placed after *C. irroratus*, Guér.

Cholus atomarius. *C.* elongato-obovatus, modice convexus, fusco-castaneus, squamis piliformibus flavidis conspersus, aliis normalibus maculatim irroratus; rostro rufo-piceo, basi apiceque vix crassiore;

antennis læte ferrugineis, clava nigra, funiculi articulo basali secundo fere duplo longiore; prothorace subtransverso, granulis ovatis nitidis sparse munito; scutello subscutiformi; elytris prothorace manifeste latioribus, seriatim punctulatis, inter puncta granulato-corrugatis, apice anguste rotundatis; pectore abdomineque lateraliter dense flavido-squamosis; femoribus sublinearibus. Long. 5 lin.

Hab. Venezuela.

Allied to *C. inornatus*, Fhs., but much narrower, and with nearly linear femora.

Cholus delumbis. *C.* oblongus, subellipticus, niger, subtiliter griseo-squamulosus; rostro elongato, basi longitudinaliter acute angulato; antennis tenuatis; funiculi articulo primo secundo duplo longiore, reliquis subrotundatis; clava longe elliptica; prothorace depresso, irregulariter granulato, disco utrinque excavato, in medio antice carinato; scutello elevato, rotundato, lævigato; elytris supra valde inæqualibus, seriatim granulatis, in medio planatis, singulis interrupte bicarinatis, carina exteriore ad humeros paulo prominula, sed vix dilatatis; femoribus haud incrassatis; corpore infra minus squamoso. Long. 9 lin.

Hab. Ecuador (Macas).

This species approaches the genus *Aphyorhamphus*, Guér., in its (slightly) prominent shoulders; but the mesosternum is not produced—a character, however, in this group of, I think, no generic value. *Cholus basalis*, Boh., should be referred to it.

Cholus bufonius. *C.* oblongo-ovatus, dorso planatus, niger, sejunctim ochraceo squamulosus, prothorace elytrisque vitta laterali ochracea, e squamulis condensatis, ornatis; rostro basi modice, apice valde, dilatato; antennis piceis; prothorace utrinque subampliato-rotundato, basi fortiter bisinuato, irregulariter vage granulato; scutello transverso, conspicue nigro; elytris elongato-cordatis, remote seriatim punctulatis, vitta laterali utrinque granulis in seriebus duabus vel tribus marginata, seriebus exterioribus minutis, aliisque etiam dispersis; corpore infra pedibusque squamulis filiformibus vestitis, squamulis longioribus albis sparse interjectis; femoribus fere linearibus. Long. 7-8 lin.

Hab. Amazons.

The row of granules bordering the lateral stripe on each side gives a cariniform sharpness to that part of the elytra, which appears to be peculiarly diagnostic of this species.

Cholus calamita. *C.* sat late obovatus, niger, opacus, supra subplanatus, vage sed fortiter granulatus, squamulis minutis piliformibus adspersus, vitta laterali, apicem elytrorum non attingente, e squamulis

Cholus mimetes. *C.* subellipticus, supra parum depressus, niger, corpore pedibusque sulphureo-squamulosis, confertim nitide granulatus, vitta laterali in prothorace elytrisque e squamulis condensatis effecta; rostro nigro, nitido, basi subcarinato; antennis nigris; scapo oculum haud attingente; funiculi articulo primo tribus sequentibus breviore; prothorace utrinque vix ampliato, confertim granulato; scutello castaneo, esquamoso; elytris basi prothorace manifeste latioribus, granulis numerosis rufo-castaneis, plurimis confluentibus, minoribus interjectis, instructis; corpore infra ut in præcedente, sed pedibus magis tenuatis, femoribus sublinearibus. Long. 7 lin.

Hab. Nicaragua (Chontales).

Allied to the last, but smaller, with proportionally more slender legs, and granulation of elytra more dense.

Cholus curialis. *C.* anguste rhombicus, modice convexus, rufo-piceus, silaceo-squamosus, granulis nitidis confertim maculatus; rostro basi subreticulato-punctato; funiculi articulo primo secundo vix longiore; prothorace utrinque paulo ampliato, vitta laterali abbreviata, lateribusque infra cum jugulo squamis densioribus tectis; scutello squamoso, subscutiformi; elytris elongato-cordatis, subseriatim granulatis, maculis parvis ochraceis, plus minusve raris, irregula-

riter notatis; corpore infra pedibusque rufo-castaneis, squamis piliformibus vage vestitis; tarsis fulvescentibus. Long. 5 lin.

Hab. Nicaragua (Chontales).

This species is also allied to the two preceding, especially the latter, but is more convex, narrower behind, the granulations proportionally smaller, those on the elytra not confluent, and the scales beneath, except on the throat and sides of the prothorax, scattered and piliform.

Cholus viduatus. *C.* subrhombicus, nitide niger, guttulis parvis, e squamulis niveis condensatis, exceptis; funiculo breviusculo; clava breviter ovata, obtusa; prothorace confertim mamillato-punctato, guttulis perpaucis dispersis; scutello oblongo, manifeste punctato; elytris subcordatis, confuse seriatim punctatis, tenuiter undulato-corrugatis, apice subtiliter crenatis; mesosterno fortiter elevato; femoribus granulis depressis instructis. Long. 8 lin.

Hab. Nicaragua (Chontales).

This species may be placed after *C. geniculatus*, Kirsch. (Berl. Ent. Zeit. 1869, p. 187).

Cholus nitidicollis. *C.* oblongus, omnino niger, guttulis niveis exceptis, supra nitidus; rostro basi bisulcato, scrobibus versus apicem incipientibus; scapo elongato, clava ovata; prothorace lævigato, pernitido; scutello subscutiformi; elytris subobconicis, remote seriatim punctulatis, singulis guttulis (circa 12) e squamis niveis in cavitatibus sitis, apice integris; corpore infra fere esquamoso; pedibus nitidis; mesosterno paulo producto. Long. 7 lin.

Hab. Bogota.

In coloration it resembles the preceding, but will be at once distinguished by its glossy prothorax.

Cholus Buckleyi. (Pl. XI. fig. 3.) *C.* oblongus, nitide niger, niveo guttatus, capite, rostro pedibusque, genibus nigris exceptis, rufo-fulvis; antennis nigro-ferrugineis, funiculo breviusculo; clava ovata, subacuminata; prothorace subtiliter punctulato, utrinque triguttato; scutello semicirculari; elytris subobconicis, remote seriatim punctulatis, cavitatibus majusculis plurimis squamis niveis repletis, ut in prothorace, decoratis, apice tenuiter serratis; corpore infra rufo-ferrugineo, sat dense citrino-squamoso. Long. 7 lin.

Hab. Ecuador (Canales).

A very distinct species, which I have dedicated to Mr. Clarence Buckley, whose two journeys into the interior of South America, proceeding from Guayaquil, resulted in the discovery of many novelties, especially in Lepidoptera.

Cholus hæmatostictus. *C.* subrhombicus, niger, supra granulatus,

squamis flavidis dense, aliisque rufo-fulvis magis sparse vestitus, illis plagas determinatas formantibus, *scil.* unam triangularem occipitalem, in prothorace tres, quarum unam magnam obcordatam in medio, in elytris quinque, quarum duas majores pone medium contiguas, et tres, unam communem, apicem versus sitas; prothorace plaga media sola sat sparse granulato; scutello subspatuliformi; elytris tenuiter striato-punctatis, apice integris; corpore infra dense albo-squamoso; mesosterno postice calloso; pedibus rufo-ferrugineis, sparse griseo-squamulosis; tarsis aureo-fulvis. Long. 7–8 lin.

Hab. Amazons.

Cholus prætorius. (Pl. XI. fig. 2.) *C.* oblongo-ovatus, ater, squamis flavidis dense, aliis aterrimis sparse vestitus, illis plagas determinatas formantibus, *scil.* in prothorace tres, quarum unam magnam triangularem, in elytris septem, duas scapulares, unam mediam fasciæformem transversam, tres apicales; capite nigro, fere esquamoso; antennis nigris, funiculi articulis quinque ultimis transversis; prothorace plaga media sat sparse granulata; scutello subspatuliformi; elytris tenuiter striato-punctatis, apice integris; corpore infra flavido-squamoso; mesosterno postice calloso; pedibus nigris; tarsis fulvis. Long. 7½ lin.

Hab. Panama.

In this and the preceding species the unguiculus, or hook, at the apex of each tibia appears to be absent; on close examination, however, it can be seen amidst the hairs which occupy that part of the tibia.

Erethistes.

(Cholinæ.)

A *Perideræo* differt *lobis* ocularibus nullis, *tibiis* anticis haud unguiculatis.

Lacordaire has already pointed out that three of Schönherr's *Choli* have the characters of *Perideræus*, with the exception of the two given above; *Perideræus* itself is only separated from *Cholus* by the length of the posterior femora, which extend beyond the elytra. The three *Choli* to be referred here are *lateralis*, *tetricus*, and *silaceo-guttatus*; four more are described below, only one of which, *E. congestus*, can be said to have an obvious affinity to any one of the others (to *C. tetricus*, Fabr.). I have another species from Minas closely allied to the latter.

Erethistes leucospilus. *E.* anguste ovatus, nitide niger, infra dense albido-squamosus, prothorace nigro-olivaceo; elytris albo-plagiatis; capite rostroque basi griseo-squamosis; antennis ferrugineis; funiculi articulo primo duobus sequentibus conjunctim haud longiore, tribus ultimis transversis; prothorace antice multo angustiore, supra subgranulato, subtiliter punctulato; scutello scutiformi; elytris prothorace haud latioribus, sat fortiter seriatim punctatis, seriebus subapproximatis, singulis cavitatibus quatuor squamis albis repletis ornatis; pedibus nigris. Long. 5 lin.

Hab. Cayenne.

Like *E. ochriventris* in outline, only a little narrower, but with a coloration after the style of *Cholus Kunzei*.

Erethistes lichenéus. (Pl. XI. fig. 6.) *E.* anguste subrhombicus, totus niger nitidus, plagis ad latera albido-squamosis exceptis; rostro basi crassiore, in medio compresso; scrobibus ultra medium rostri haud extensis; scapo antennarum apicem versus sat fortiter arcuato; funiculo elongato; clava ovali; prothorace longitudine latitudini fere æquali, irregulariter sat confertim granulato, inter granula subtilissime mamillato-punctato (granulis etiam puncto singulo margine anteriore impressis); scutello transversim rotundato; elytris subconicis, remote seriatim punctulatis, subcorrugatis, singulis plagis duabus lateralibus, anteriore permagna, e squamulis flavidulis, margine densioribus, formatis, plaga simillima prothorace utrinque ornato; meso-

granulis subundulato-transversis munitis, corpore infra albo-squamoso; tibiis posticis breviusculis, compressis. Long. 3½ lin.

Hab. Venezuela (Santa Marta).

Anænomus.

(Cholinæ.)

Characteres ut in *Cholo*, sed *capite* pone oculos ampliato; *rostro* tenuato, recto, basi abrupte curvato; *oculis* (rotundatis) fere rostro obsitis; *femoribus* posticis elongatis, *tibiis* brevibus, apice mucronatis, haud unguiculatis; *processu* intercoxali triangulari.

A curious form, especially in regard to the head; in its short tibiæ it resembles *Brachycnemis*, but otherwise it is more nearly allied to *Cholus*.

Anænomus rubigineus. (Pl. XI. fig. 5.) A. oblongus, rufo-ferrugineus, squamis piliformibus albidis vage indutus; rostro elongato, apicem versus nitido, et fortiter dilatato; antennæ præmedianæ, scapo apicem versus arcuato, funiculi articulo primo tribus sequentibus conjunctim longiore; clava sat breviter ovata; prothorace subconico, transversim corrugato-granulato, squamis valde adspersus;

scutello rotundato; elytris breviusculis, prothorace basi paulo latioribus, lateribus modice rotundatis, sulcato-punctatis, punctis approximatis, squamis repletis, interstitiis valde convexis, apice late rotundatis; pectore paulo excavato, griseo piloso; femoribus apice, tibiisque etiam apice, tarsisque nigris, his articulo secundo minore. Long. 7. lin.

Hab. Brazil.

ASTYAGE.

(Cholinæ.)

Cholo affinis, sed *scapo* antennarum oculo impingente; *prothorace* conico, angulo postico acuto; et *tibiis* anticis haud unguiculatis.

The only exponent of this genus is an insect resembling in its coloration *Dionychus parallelogrammus*, Germ., but remarkable for the peculiar form of the prothorax.

ASTYAGE LINEIGERA. (Pl. XI. fig. 8.) *A.* oblongo-ovata, parum convexa, fusco-castanea, flavido-squamosa; rostro parum arcuato, nigro, nitidissimo, basi fronteque capitis squamis elongatis sejunctim vestitis; antennis piceis, clava brunnea, funiculi articulo primo duobus sequentibus conjunctim parum breviore; oculis rotundatis; prothorace conico, basi parum bisinuato, quam longitudine vix latiore, supra maculatim squamoso; scutello breviter ovato; elytris pone humeros latioribus, depressis, apicem versus gradatim angustioribus, apice ipso paulo emarginatis, singulis sulcis decem, squamis dense repletis, instructis, interstitiis nitentibus; corpore infra dense subsulphureo-squamoso; femoribus validis, infra dente parvo instructis; tarsis articulo primo secundo majore. Long. 8 lin.

Hab. Brazil.

OZOPHERUS.

(Cholinæ.)

Cholo affinis, sed *oculis* elongatis, transversis, infra acuminatis; *prothorace* lobis ocularibus distinctis; *coxis* anticis approximatis; *tibiis* apice biunguiculatis, intermediis et posticis margine posteriore apice oblique emarginatis et ciliatis.

The eyes are partly concealed in repose by the ocular lobes, which, however, although distinct, are not very prominent. The sole exponent of this genus is a remarkable insect on account of the spiniform tubercles (somewhat variable in size and number) with which the elytra are furnished, and the dense fringe of hairs clothing the inner edge of the anterior and posterior tibiæ.

one of the many discoveries of Mr. Bates.

NEÆDUS BIVITTATUS. (Pl. XI. fig. 7.) *N.* ellipticus, niger, opacus, rostro, antennis pedibusque rufo-testaceis, supra utrinque vittis duabus albo-squamosis a basi rostri ad apicem elytrorum continuatis ornatus; rostro modice tenuato; funiculo articulis tribus basalibus longioribus, subæqualibus, quarto quintoque multo brevioribus, duobus ultimis turbinatis; oculis magnis, rotundatis; prothorace subconico, lateribus perparum rotundato, tenuiter subtransversim granulato: scutello valde transverso; elytris prothorace manifeste latioribus, in medio paulo depressis, utrinque leviter rotundatis, apice ipso rotundato, supra tenuiter sulcatis, interstitiis confertim rugoso-punctatis: corpore infra dense subsulphureo-squamoso; tibiis intus sat fortiter bisinuatis. Long. 4 lin.

Hab. Amazons.

CALLINOTUS MICROSPILOTUS. *C.* elongato-ellipticus, niger, squamis subaurantiacis plerumque dense tectus; rostro versus apicem sensim et fortiter incrassato; funiculo antennarum articulo basali quatuor sequentibus æquali, quinque ultimis transversis, in clavam gradatim continuatis, pubescentibus; prothorace transverso, interrupte subgranulato, plagis indeterminatis tribus longitudinalibus, e

squamis minus condensatis, notato; scutello nigro, fere rotundato, elytris prothorace perparum latioribus, lateribus leviter rotundatis, apicibus subacuminatis, granulis minutis plurimis maculatim adspersis; corpore infra pedibusque minus dense silaceo-squamosis; femoribus infra dente parvo armatis. Long. 7 lin.

Hab. Brazil.

I refer this very distinct species to *Callinotus*, Schön., on account of its approximate anterior coxæ, and the club of the antennæ being closely adnate to the funicle. The spots on the upper surface caused by the black granules are small but very distinct. *Cholus carinatus*, Guér., I also refer to this genus.

Solenopus bilineatus. *S.* oblongus, niger, fusco-squamosus, vittis duabus albo-squamosis utrinque ad apicem prothoracis usque ad apicem elytrorum continuatis; rostro fusco-piceo, quinquecarinato (♀ minus notato), sparse griseo-squamuloso; antennis piceis, funiculo articulis duobus basalibus æqualibus, singulisque tertio quartoque conjunctim æqualibus, ultimo ad clavam arcte applicato; prothorace subtransverso, utrinque ampliato-rotundato, granulis plurimis plus minusve crescentiformibus sat sparse transversim notato; scutello subscutiformi; elytris prothorace paulo latioribus, postice gradatim angustis, apicibus rotundatis, supra fortiter seriatim punctatis, inter puncta transversim granulato-rugosis, posticis minus punctatis, lævibus; corpore infra pedibusque sparse grisescenti-squamosis. Long. 8 lin.

Hab. Cayenne; Mexico.

The metasternum and first two abdominal segments are largely excavated in this species, as they are in *S. morbillosus*, Drury, and *S. spinicollis*, Boh.; but this is probably a sexual character distinctive of the male. The names of this and the following species are adopted from Dejean's 'Catalogue.'

Solenopus transversalis. (Pl. XI. fig. 4.) *S.* oblongus, ater, opacus, squamulis minutis concoloribus adspersus; rostro tricarinato, basi rude punctato; antennis ferrugineis, ut in præcedente descriptis; prothorace minusculo, transverso, utrinque ampliato-rotundato, granulis planiusculis dispersis munito, antice vage punctulato; scutello elevato, subscutiformi; elytris prothorace manifeste latioribus, subparallelis, apicem versus rotundatis, seriatim fortiter clathrato-punctatis, punctis postice gradatim minoribus, basi, fascia transversa pone medium, apiceque albo-squamosis; sternis, lateribus abdominis, pedibusque, tibiis exceptis, squamulis filiformibus sat dense vestitis; femoribus infra dente parvo acuto armatis; tibiis intermediis brevibus. Long. 7 lin.

Hab. Brazil.

Cryptaspis amplicollis. (Pl. XI. fig. 10.) *C.* obovata, nigra, squamositate grisea supra tecta; capite vage squamoso; rostro basi leviter punctulato; antennis ferrugineis; funiculi articulo primo secundo duplo longiore, 2.–4. obconicis, 5.–7. oblongo-obovatis; clava articulo basali reliquis conjunctim æqualibus; prothorace transverso, subtiliter granulato; elytris prothorace plus sesquilongioribus, obsolete granulatis; corpore infra vage squamoso; pedibus squamis piliformibus parce vestitis. Long. 4 lin.

Hab. New Granada.

Guioperus eques. *G.* ovatus, niger, umbrino-squamosus, elytris fasciis duabus griseis ornatis; rostro rude punctato; antennis nitide piceis, clava tomentosa; prothorace haud crebre granulato; scutello nigro; elytris utrinque subparallelis, sulcato-punctatis, interstitiis, præsertim basi, fortiter granulatis, fascia fere in medio, alteraque postice sitis; corpore infra pedibusque sordide umbrino-squamosis. Long. 8 lin.

Hab. Nicaragua (Chontales).

The metasternum presents a fold or crest behind each of the posterior coxæ in the species of this genus; but in this it is so raised as to form a stout spine or tooth. This is a very distinct

species, and is one of the many discoveries of Mr. E. Janson, jun. It may be placed after *G. Klugi*, but is differently coloured, has longer and more parallel elytra, and is more coarsely granulated.

Euthyrhinus pictus. (Pl. X. fig. 12.) *E.* ovalis, niger, omnino dense albido-squamosus, supra fuscescente notatus; rostro breviusculo, parum arcuato, nigro-piceo, leviter punctato, basi parce squamoso; antennis piceis; funiculo brevi, articulo secundo primo paulo longiore; clava late ovata; prothorace magis transverso, utrinque rotundato, fascia arcuata in medio plagaque basali pallide fuscescentibus et sat parce granulatis; scutello nigro; elytris oblongo-subcordatis, sulcato-punctatis, interstitiis convexis granulis nitide nigris, plerumque uniseriatim sitis, postice sensim minoribus et magis dispersis, pone medium fascia arcuata, antice dilutiore, et singulis macula basali, fuscescentibus decoratis; femoribus dente parvo instructis. Long. 3¼ lin.

Hab. Singapore.

Euthyrhinus iconicus. *E.* obovatus, fuscus, dense squamosus; capite fulvo-squamoso, antice nigro-punctato; rostro brunneo, perparum arcuato, rude punctato, basi squamoso; antennis rufo-ferrugineis; funiculi articulis duobus basalibus æqualibus, longiusculis, tertio parum oblongo, cæteris modice transversis; clava late ovali; prothorace utrinque ampliato, fulvo-squamoso, disco saturatiore, plagis duabus basalibus exceptis, et subtiliter nigro-granulato; scutello minuto; elytris oblongo-subcordatis, sulcato-punctatis, interstitiis convexis, alternis magis elevatis, granulis nigris præcipue prope suturam, et postice evanescentibus, adspersis, fuscis, plaga magna subalbida dorsali, pone medium valde constricta, ornatis; corpore infra, pedibusque densissime albido-squamosis, his extus saturatioribus; femoribus dente minuto instructis. Long. 4½ lin.

Hab. Mysol.

I am unable to separate *E. squamiger*, Wh., from *E. meditabundus* of collections, and probably also of Boheman in Schön.; but the species of Fabricius (the type is still extant in the British Museum) seems to be somewhat different. I have half a dozen other species from the Malay region besides the two here described, which are exceptionally well marked; one of them, from Sarawak, is very closely allied to *E. squamiger*. Boisduval's *E. monachus*, judging from the very short description, I am inclined to identify with a rather common species from Queensland.

Aonychus luctuosus. (Pl. XII. fig. 1.) *A.* late ovatus, atro-squamosus, supra concinne albo-maculatus, subtus pedibusque dense albo-squamosis; scutello albo; elytris seriatim punctatis, interstitiis latis, planatis. Long. 2¾ lin.

Hab. West Australia.

vato, in medio fortiter carinato; elytris [illegible], [illegible] varie-gatis, striato-punctatis, interstitiis rude elevatis, tertio a sutura tuberculis tribus, quinto tuberculo uno, et pone humeros tuberculo valido conico instructis; pedibus elongatis; femoribus nigris, concinne flexuose albo annulatis; tibiis fusco albidoque annulatis; tarsis ochraceis. Long. 5½ lin.

Hab. Sarawak.

Lacordaire founded the genus *Ectatorhinus* on what I believe to be a female; the two very marked species here described are of the opposite sex and agree generically with the male of *E. Wallacei*, the type. The first species, which I have named after Arthur Adams, Esq., its discoverer, is at once distinguished from the latter by the tubercles on the elytra, and is interesting from its northern habitat. The second species differs from both in having a strong conical tubercle on each side behind the shoulder. The contiguous anterior coxæ is the only really important character differentiating *Ectatorhinus* from *Mecocorynus*; in my specimens I do not find the scape attaining the eye as stated by Lacordaire. Of the latter genus I have five undescribed species, with habitats ranging from New Guinea to Cambodia and China.

INOZETES.

(Cryptorhynchinæ.)

Rostrum breve, rectum, validum; *scrobes* præmedianæ, obliquæ, infra rostrum currentes, oculos haud attingentes. *Antennæ* breves; *funiculus* 6-articulatus, articulo primo elongato, secundo obconico, cæteris transversis, gradatim latioribus, in clavam continuatis. *Oculi* ovati, liberi. *Prothorax* transversus, utrinque rotundatus, apice vix productus, lobis ocularibus fere obsoletis. *Elytra* oblongo-cordata, prothorace paulo latiora. *Pedes* validi; *femora* incrassata, subtus dentata; *tibiæ* breves, subrectæ, intus bisinuatæ; *tarsi* articulis tribus basalibus conjunctim triangularibus, quarto mediocri. *Propectus* brevissimum, inter coxas anticas excavatum; *mesosternum* antice verticale.

Allied to *Psepholax* and *Strongylopterus*, but differing from both in the six-jointed funicle and very short propectus; this is due to its deep emargination, which only leaves a narrow portion in front of the anterior coxæ.

INOZETES PETECHIALIS. (Pl. X. fig. 11.) *I.* ovalis, convexus, fulvo-testaceus, supra variegatim griseo ochraceoque squamosus; capite antice convexo; rostro latitudine plus duplo longiore, versus apicem squamis sensim minoribus; antennis testaceis, clava infuscata; prothorace subtransverso, basi haud angustiore, sat dense squamoso; scutello rotundato; elytris striato-punctatis, interstitiis transversim granulatis, squamis paulo adspersis, maculis ochraceo-testaceis, e squamis minus condensatis, irregulariter irroratis; corpore infra sat sparse, pedibus magis dense squamosis; femoribus posticis validioribus, dente majore instructis. Long. 4 lin.

Hab. Batchian.

OSSETERIS.

(Cryptorhynchinæ.)

Rostrum breve, validum, rectum, paulo depressum; *scrobes* medianæ, rectæ, dimidium inferius oculorum attingentes. *Antennæ* breves; *funiculus* 7-articulatus, articulis 1. 2. breviter obconicis, cæteris valde transversis, in clavam continuatis. *Oculi* subrotundati, infra paulo acuminati, grosse granulati. *Prothorax* vix transversus, utrinque rotundatus, antice tubulatus, apice productus, lobis ocularibus latis. *Elytra* oblonga, subcordata,

THEREBUS.

(Cryptorhynchinæ.)

Empleuro affinis, sed *rostro* capite triplo longiore, tenuiore, recto, et *scrobibus* medianis.

The rostrum is also much longer and more slender and cylindrical than in *Osseteris*; the eye is ovate and finely faceted, while in *Osseteris* and *Empleurus* it is coarsely faceted; in the latter the scrobes commence nearly at the base of the mandibles. The type of the genus is a yellowish-brown insect (under the lens the scales are seen to have a golden tinge) and bears a certain resemblance to *Cepurus torridus*.

THEREBUS CEPUROIDES. *T.* oblongus, piceus, sat dense subaureo-squamosus; rostro apicem versus depresso; mandibulis porrectis, antennis ferrugineis; funiculi articulis duobus basalibus breviusculis, primo paulo longiore, cæteris valde transversis; prothorace transverso, antice angusto, tubulato, utrinque rotundato; scutello scutiformi, squamulis minutis pallidioribus dense tecto; elytris prothorace manifeste latioribus, ad latera vix rotundatis, sulcato-punctatis; corpore

infra pedibusque squamulis angustioribus flavescentibus vestitis. Long. 4½ lin.

Hab. Western Australia.

The following is a Key to the genera of Lacordaire's two groups "Pséphola cides" and "Strongyloptérides."

Scrobes oblique, attaining the lower margin of the eye.
- Propectus of normal length .... *Psepholax*, Wh.
- Propectus very short .... *Inozetes*, n. g.

Scrobes straight, attaining the anterior margin of the lower half of the eye.
- Ocular lobes feeble.
  - Mesosternum vertically truncate anteriorly, bounding the pectoral canal behind.
    - Scrobes terminal.............. *Empleurus*, Lac.
    - Scrobes median.
      - Eyes ovate, transverse, finely faceted. *Therebus*, n. g.
      - Eyes nearly round, coarsely faceted. *Osseteris*, n. g.
  - Mesosternum declivous, not forming part of the canal.
    - Eyes partly covered by the prothorax. *Strongylopterus*, Schön.
    - Eyes free..................... *Glechinus*, Pasc.
- Ocular lobes produced .... *Aularhinus*, Schön.

Metrania.

(Cryptorhynchinæ.)

Rostrum elongatum, tenuissimum, arcuatum, apicem versus depressum; *scrobes* laterales, basi propius quam in medio incipientes. *Antennæ* mediocres; *scapus* oculum haud attingens; *funiculus* 7-articulatus, articulis elongatis, duobus ultimis ovalibus; *clava* ovata, distincta. *Oculi* magni, subrotundati, antice approximati, grosse granulati. *Prothorax* transversus, subconicus, lobis ocularibus nullis. *Scutellum* triangulare. *Elytra* subcordata, prothorace multo latiora. *Pedes* modice elongati; *femora* paulo incrassata, infra dente parvo instructa; *tibiæ* subrectæ, compressæ, apice unguiculo brevi armatæ; *tarsi* normales; *unguiculi* divergentes. *Rima* pectoralis ad segmen-

Rostrum validum, subarcuatum; *scrobes* medianæ, laterales. *Funiculus* breviusculus, articulis duobus basalibus longioribus, ultimo latiore; *clava* elongata, subadnata. *Oculi* tenuiter granulati. *Prothorax* transversus, antice angustus, apice productus, lobis ocularibus prominulis. *Elytra* prothorace vix latiora, humeris callosa. *Femora tibiæque* compressæ, illa longiuscula, valida, infra dente instructa; hæ breves, basi extus angulatæ; *tarsi* normales; *unguiculi* divergentes. *Mesosternum* valde elevatum, fornicatum.

It is very probable that *Cryptorhynchus albicollis*, Germ., belongs to this genus. Unfortunately *Cryptorhynchus* has become one of those thoroughly vague generic names that carries with it no idea of definite characters; but the colouring, which is remarkable, is very similar to that of the species described below. This genus belongs to the *Chætectetorus* form, and is allied to *Metacysmia*, which has a small claw-joint, a longer metasternum, and a broad intercoxal process. *Chimades*, another ally, has, *inter alia*, straight, terete tibiæ.

Metyrus collaris. (Pl. XII. fig. 4.) *M.* obovatus, fuscus, squa-

mosus; capite ochraceo, nigro vario; rostro prothorace breviore, vage punctato; antennis ferrugineis, subsetulosis; clava nigra; prothorace plerumque dense albo-squamoso, basi fusco-bimaculato, dorso in medio linea elevata longitudinali, tuberculisque sex (2 apicalibus, 4 medianis, transversis) notatis; scutello subquadrato; elytris oblongis, ruguloso-punctatis, squamulis fuscis inconspicuis vestitis, macula humerali plagaque apicali albidis, tuberculis fasciculatis nonnullis adspersis, præcipue singulatim duobus rotundatis basalibus, interiore majore, alteroque apicali; corpore infra pedibusque dense albido fuscoque squamosis. Long. 4¼ lin.

Hab. West Australia.

Poropterus porriginosus. (Pl. XII. fig. 2.) *P.* ovatus, supra depressus, ater, squamulis concoloribus suberectis sat sparse tectus; rostro valido, prothorace breviore; antennis rufo-piceis; clava nigra, tomentosa; scapo elongato; funiculi articulo secundo tribus sequentibus conjunctim longiore, primo breviore, ultimo ampliato; prothorace latitudine paulo breviore, antice multo angustiore, utrinque rotundato, basi paulo incurvato, angulis posticis rotundato, apice modice producto, in medio longitudinaliter carinulato, dorso plagis duabus nudis notato; scutello inviso; elytris basi prothorace parum latioribus, deinde fortiter rotundatis, postice gradatim declivibus, subcostatis, costis duabus dorsalibus singulatim subbifasciatis, sat remote leviter foveatis; pedibus rude squamosis; processu intercoxali dilatato; abdomine segmentis duobus basalibus ampliatis, sutura prima in medio minus distincta. Long. 4 lin.

Hab. Victoria.

The contour of this species, almost wedge-shaped, except for the slightly rounded outline, from the posterior third of the elytra, is its most striking character.

Poropterus musculus. *P.* subovatus, niger, squamositate brunnea tectus, squamis erectis plerumque fuscis adspersus; rostro valido, sat breviusculo; antennis subpiceis, funiculi articulis duobus basalibus conjunctim scapo parum longioribus, primo longiore et crassiore; prothorace latitudine breviore, antice haud producto, pone apicem utrinque fortiter rotundato, basi subtruncato, supra fasciculis sex instructo, 2 apicalibus, 4 transversim antemedianis; scutello orbiculari; elytris modice convexis, lateribus leviter rotundatis, postice perparum latioribus, humeris fortiter productis, apicem versus subito angustioribus, apice ipso late rotundatis, dorso fasciculis plurimis adspersis; pedibus rude squamosis; abdomine segmento secundo quam 3. 4. conjunctim fere duplo longiore, sutura prima obliterata. Long. 3 lin.

Hab. Tasmania.

The smallest species of the genus, and in habit like *Agenopus*

squamosus; rostro valido, rude, basi seriatim, punctato; antennis piceis; funiculi articulo secundo primo vix sesquilongiore; prothorace subobcordato, supra planato, antice valde producto, apice anguste rotundato, basi prope scutellum fortiter biimpresso, raro irregulariter punctato, tuberculis quatuor parvis in medio transversim sitis; scutello, ut videtur, nullo; elytris subovalibus, modice convexis, prothorace paulo latioribus, sat vage subseriatim foveatis, interspatiis irregulariter callosis, postice rotundato-declivibus, tuberculis majusculis notatis, humeris parum productis; corpore infra pedibusque squamis elongatis vestitis; tibiis, præsertim posticis, brevibus. Long. 3⅔–4 lin.

Hab. New South Wales (Illawarra).

In outline like the preceding, but, *inter alia*, with the apex of the prothorax entire, the shoulders not lobed, short tibiæ, &c. *Poropterus succosus*, Boh., seems to me to be the same as *Cryptorhynchus succisus*, Er. It is difficult to understand how so admirable an entomologist as Erichson* could have satisfied himself with referring so many species to *Cryptorhynchus*, a name even now of no definite meaning, without some notice of the structural peculiarities that go to the differentiation of genera.

* Wiegmann, Arch. 1842, i. pp. 202 *et seqq.*

Petosiris cordipennis. (Pl. XII. fig. 3.) *P.* brevis, latus, supra modice convexus, fuscus, squamis elongatis erectis interjectis, sordide silaceis sat dense vestitus; capite inter oculos depresso, in medio foveato; rostro prothorace paulo breviore; antennis ferrugineis; funiculi articulo secundo quam primo vix sesquilongiore; prothorace transverso, lateribus pone apicem parallelo; elytris prothorace multo latioribus, conjunctim cordiformibus, sparse seriatim punctatis, singulis tuberculis fasciculatis circa 8 notatis—3 basalibus, quorum uno humerali magis producto, 3 antemedianis, 2 posticis; femoribus in medio modice incrassatis. Long. 3¾ lin.

Hab. Queensland.

Very distinct from *P. subereus*, and with thicker femora, but in other respects generically identical.

Hexymus monachus. *H.* ovatus, fuscus, indumento griseo tectus, squamisque subsilaceis elongatis omnino adspersus; capite inter oculos transversim excavato; rostro vix tenuato; antennis ferrugineis, funiculi articulo primo secundo sesquilongiore, tertio breviter obconico, tribus ultimis subturbinatis; clava breviter ovata; prothorace transverso, elevato, dorso quadricalloso, apice crista cariniformi munito, lateribus rotundato, lobis ocularibus obsoletis; scutello punctiformi; elytris valde convexis, seriatim foveatis, callis plurimis, plerumque indeterminatis, notatis. Long. 4 lin.

Hab. Queensland (Rockhampton).

A very distinct species from its only congener *H. tuberosus*.

Colobodes nodulosus. *C.* crassus, niger, squamulis umbrinis, in medio fuligineis, dense vestitus; rostro subvalido, prothorace paulo breviore, apice nudo, nitido, tenuiter punctulato; antennis rufo-testaceis, funiculi articulo secundo primo sesquilongiore, cæteris turbinatis, clava ampla, obovata, fuscescente; prothorace parvo, conico, antice elevato, apice producto, tuberculis fasciculatis sex, 2 apicalibus magnis, 4 parvis in medio transversim sitis; scutello suborbiculari, squamoso; elytris ampliatis, pone basin valde convexis, lateribus parallelis, fortiter sulcatis, interstitiis squamoso-tuberculatis, tertio basi magis elevato; corpore infra pedibusque valde squamosis. Long. 4 lin.

Hab. Batchian.

Colobodes fasciculatus. (Pl. X. fig. 7.) *C.* minus crassus, nigro-fusco-squamosus, elytris striga abbreviata obliqua basali ochracea ornatis; rostro subvalido, prothorace paulo breviore, apice nudo, nitido, sat fortiter punctato; antennis ferrugineis; funiculi articulis duobus basalibus longitudine æqualibus, tertio obconico, cæteris subturbinatis, gradatim crassioribus; clava breviter obovata; prothorace latitudine vix longiore, utrinque rotundato, antice vix elevato, apice producto,

tundati, antice haud approximati, a prothorace distantes. *Prothorax* conicus, lobis ocularibus nullis. *Scutellum* subrotundatum. *Elytra* trigonata, pygidium obtegentia, humeris angulato-productis. *Pedes* mediocres; *femora* valida, infra obsolete dentata; *tibiæ* apice unco valido armatæ; *tarsi* articulo tertio profunde bilobo. *Coxæ* anticæ distantes. *Mesosternum* transversim leviter excavatum. *Metasternum* breve, tumidum. *Abdomen* segmentis duobus basalibus ampliatis.

A genus allied to *Pinarus* and *Piazurus* on account of the mesosternum entering into the formation of its pectoral canal, but with a stout shortish rostrum, rather small eyes, not contiguous to the prothorax or to one another, and the femora but slightly thickened and not toothed beneath.

Latychus rivulosus. (Pl. XIII. fig. 9.) *L.* niger, sat dense griseo fuscoque squamosus; capite inter oculos excavato; rostro ferrugineo, in medio leviter carinulato, subreticulato-punctato; antennis ferrugineis; funiculi articulo secundo longiore; prothorace fusco-trivittato, vitta intermedia latiore; elytris supra irregularibus, lineatim sulcatis, interstitiis convexis, tertio tuberculis angustis duobus

(uno basali, uno mediano), interstitio quinto unico postico, notatis, apicibus divergentibus; corpore infra pedibusque silaceo-squamosis; metasterno valide binodoso. Long. 7 lin.

Hab. Brazil.

Methyorrhina.

(Baridinæ.)

Rostrum modice elongatum, haud compressum, ad basin quasi abscissum; *scrobes* submedianæ, infra rostrum cito currentes. *Antennæ* breviusculæ; *scapus* oculum attingens; *funiculus* 7-articulatus, articulo primo ampliato, cæteris gradatim incrassatis; clava adnata. *Oculi* ovati, mediocres, inferi, tenuiter granulati. *Prothorax* convexus, subsemicircularis, basi bisinuatus, lobis ocularibus late productis. *Elytra* prothorace parum latiora, breviuscula, depressa. *Pedes* breves; *femora* crassa, mutica; *tibiæ* breves, rectæ, apice unguiculatæ; *coxæ* anticæ sat, intermediæ valde remotæ. *Pectus* latum, in medio transverse sulcatum. *Abdomen* segmentis 3. 4. brevibus; *suturæ* rectæ.

Allied to *Phacelobarus*, a curious genus from Madagascar, but with ocular lobes, and the rostrum not compressed or gibbous at the base and sharply constricted at its junction with the head.

Methyorrhina hispida. *M.* breviuscula, fusca, setulis erectis albis silaceisque, nigris interjectis, parce vestita; rostro prothorace evidenter breviore, sat crebre oblongo-punctato, basi rude squamoso; articulo primo funiculi secundo plus duplo longiore; prothorace basi latiore, crebre punctato, lobo scutellari lato; scutello transverso, postice rotundato; elytris basi latioribus, lateribus gradatim parum angustioribus, apice late rotundatis; corpore infra pedibusque squamis piliformibus subadpressis vestitis. Long. 2¼ lin.

Hab. Brazil.

Pithecomus.

(Baridinæ.)

Caput exsertum, supra rostrum continuatum; *rostrum* subtenuatum, modice elongatum, paulo arcuatum, a basi gradatim angustius; *scrobes* submedianæ, infra rostrum cito currentes. *Antennæ* breviusculæ; *scapus* oculum attingens; *funiculus* 7-articulatus, articulo primo longiore, cæteris brevissimis, sensim incrassatis; *clava* adnata. *Oculi* mediocres, ovati, transversi, inferi, tenuiter granulati. *Prothorax* transversus, lateribus parallelis, apice angustior, lobis ocularibus nullis. *Elytra* brevia,

Hab. Bogota.

BEBELATUS.

(Baridinæ.)

Rostrum validum, arcuatum; *scrobes* subterminales. *Funiculus* 7-articulatus, articulis duobus basalibus longiusculis, tribus ultimis transversis; *clava* libera, distincte articulata. *Oculi* grosse granulati. *Prothorax* inæqualis, rotundatus, lobis ocularibus prominulis. *Scutellum* triangulare. *Elytra* globosa, prothorace valde latiora. *Pedes* breviusculi; *femora* modice incrassata; *tibiæ* compressæ, basi arcuatæ, apice unco obliquo armatæ; *tarsi* normales, *unguiculi* divergentes. *Coxæ* anticæ basi contiguæ, faciebus interioribus pro receptione rostri oblique planatis. *Pectus* breviusculum, canaliculatum, utrinque dente triangulari armatum. *Mesosternum* integrum, declive. *Metasternum* brevissimum. *Abdomen* segmento secundo duobus sequentibus conjunctim breviore.

The sole exponent of this genus resembles a small spider, and is quite different from any other *Baris* known to me. It may be placed with the two preceding genera and with *Phacelobarus* and

Scambus, all very distinct in habit. After its shape, the most striking peculiarity consists in the way in which the anterior coxæ are sloped away for the reception of the rostrum.

Bebelatus aranea. (Pl. XIII. fig. 7.) *B.* brevis, tumidus, niger, squamis griseo-fuscis tectus, aliisque elongatis adspersus; rostro squamoso, prothorace multo breviore; antennis testaceis; prothorace parvo, dorso tuberculis quatuor majoribus, lateribus quinque munitis, lobo basali truncato; elytris parum latioribus quam longioribus, indistincte seriatim punctatis, singulis novem tuberculis in series tres dispositis; pedibus valde squamosis; tarsis articulo ultimo unguiculisque testaceis. Long. 2 lin.

Hab. Amazons.

Eurypages.

(Baridinæ.)

Rostrum elongatum, cylindricum, parum arcuatum; *scrobes* medianæ. *Antennæ* tenues, *scapo* oculum haud attingente; *funiculo* articulis duobus basalibus æqualibus, haud elongatis, cæteris gradatim brevioribus. *Oculi* ovales, tenuissime granulati. *Prothorax* transversus, convexus, apice tubulatus, basi bisinuatus, utrinque fortiter rotundatus. *Pedes* longiusculi, antice in mare multo longiores; *femora* in medio crassiora, infra fortiter dentata; *tibiæ* anticæ rectæ, cæteræ flexuosæ, apice mucronatæ, posticæ corbellis cavernosis; *tarsi* antici (♂) valde dilatati, fimbriati, cæteri, anticique in fœmina, art. duobus basalibus triangularibus, tertio fortiter bilobo; *unguiculi* connati. *Coxæ* anticæ haud approximatæ. *Prosternum* haud canaliculatum. *Metasternum* modice elongatum. *Processus* intercoxalis latissimus.

Compared with *Centrinus* in its Schönherrian sense, *Eurypages* differs principally in the absence of the pectoral canal, and in the remoteness of the anterior coxæ. The length of the fore legs in the male and their dilated tarsi may be of little more than specific value. The species described below is a rather isolated form: it has the three intermediate segments of the abdomen curved at the sides; the scales on the elytra are arranged on each side of the striæ like the barbs of a feather.

Eurypages pennatus. (Pl. XIII. fig. 6.) *E.* rhombicus, niger, squamis piliformibus griseis munitus; capite punctis confertis unisquamigeris impresso; rostro basi rude punctato; prothorace supra

Phænomerus exilis. *P.* elongatus, nigrescens, setulis cinereis subfasciatim condensatis obsitus; rostro, antennis pedibusque ferrugineis, illo capite sesquilongiore, dimidio basali antice lineis tribus elevatis notato; funiculo brevi; oculis magnis; prothorace crebre punctato, in medio carinula lævi notato; elytris striato-punctatis, interstitiis convexis, subtilissime corrugatis; corpore infra sparse niveo-setuloso. Long. $1\frac{1}{3}$ lin.

Hab. Queensland (Gayndah).

A *Phænomerus* has lately been described by Dr. Gerstaecker, from Zanzibar (I have long had it in my collection from Natal). Previously a single species only was known (from Ceylon, and perhaps India); but Mr. Wallace's collection contained six others besides the one described above. The species before us, whose discovery we owe to Mr. Masters, in his recent expedition after that strange ganoid fish, the *Ceratodus Forsteri*, is a narrower form than *P. Sundevalli*, the prothorax less coarsely punctured, the interstices between the elytral striæ much less convex, the setæ more scattered, but forming a slightly marked band on the middle of the elytra.

EXPLANATION OF THE PLATES.

PLATE X.

Fig. 1. *Semelima triangulum.*
2. *Berethia sannio.*
3. —— *medinotata*; 3 *a*, hind leg.
4. *Saginesis latipennis*; 4 *a*, lateral view of the head.
5. *Acicnemis meriones*; 5 *a*, hind leg.
6. *Ottistira bispinosa*; 6 *a*. lateral view of the head and scape.
7. *Colobodes fasciculatus.*
8. *Onychopoma parda.*
9. *Cyrtozemia dispar*; 9 *a*, hind tibia and tarsus.
10. *Ectatorhinus femoratus*; 10 *a*, lateral view of the head (♂).
11. *Inezetes petechialis*; 11 *a*, lateral view of the head and scape.
12. *Euthyrhinus pictus.*
13. Front view of the head of *Ottistira ocularis.*
14. Lateral view of the head and part of prothorax of *O. gibbosa.*
15. Lateral view of the head of *Osseteris scutellaris.*
16. Lateral view of the head of *Ectatorhinus wallacei*, Lac. (♀).
17. Antenna of *Acicnemis frenata.*

PLATE XI.

Fig. 1. *Cholus notabilis.*
2. —— *prætorius.*
3. —— *Buckleyi.*
4. *Solenopus transversalis.*
5. *Anænomus rubigineus*; 5 *a*, lateral view of the head and scape.
6. *Erethistes licheneus*; 6 *a*, lateral view of the head and scape.
7. *Neædus bivittatus*; 7*a*, lateral view of the head and scape.
8. *Astyage lineigera*; 8 *a*, lateral view of the head and antenna.
9. *Ozopherus muricatus*; 9 *a*, hind tibia and tarsus; 9 *b*, lateral view of the head and scape.
10. *Cryptaspis amplicollis.*

PLATE XII.

Fig. 1. *Aonychus luctuosus.*
2. *Poropterus porrigineus.*
3. *Petosiris cordipennis.*
4. *Metyrus collaris.*
5. *Nemestra incerta.*
6. *Cycotida lineata*; 6 *a*, lateral view of the head.
7. *Cechides amænus*: 7*a*, lateral view of the head.
8. *Timareta figurata*; 8 *a*, part of hind tarsus and first tarsal joint; 8 *b*, lateral view of the head.
9. *Nedyleda semiusta*; 9 *a*, lateral view of the head.
10. *Belus parallelus.*

16. Lateral view of the head of *Dialeptopus granulatus.*

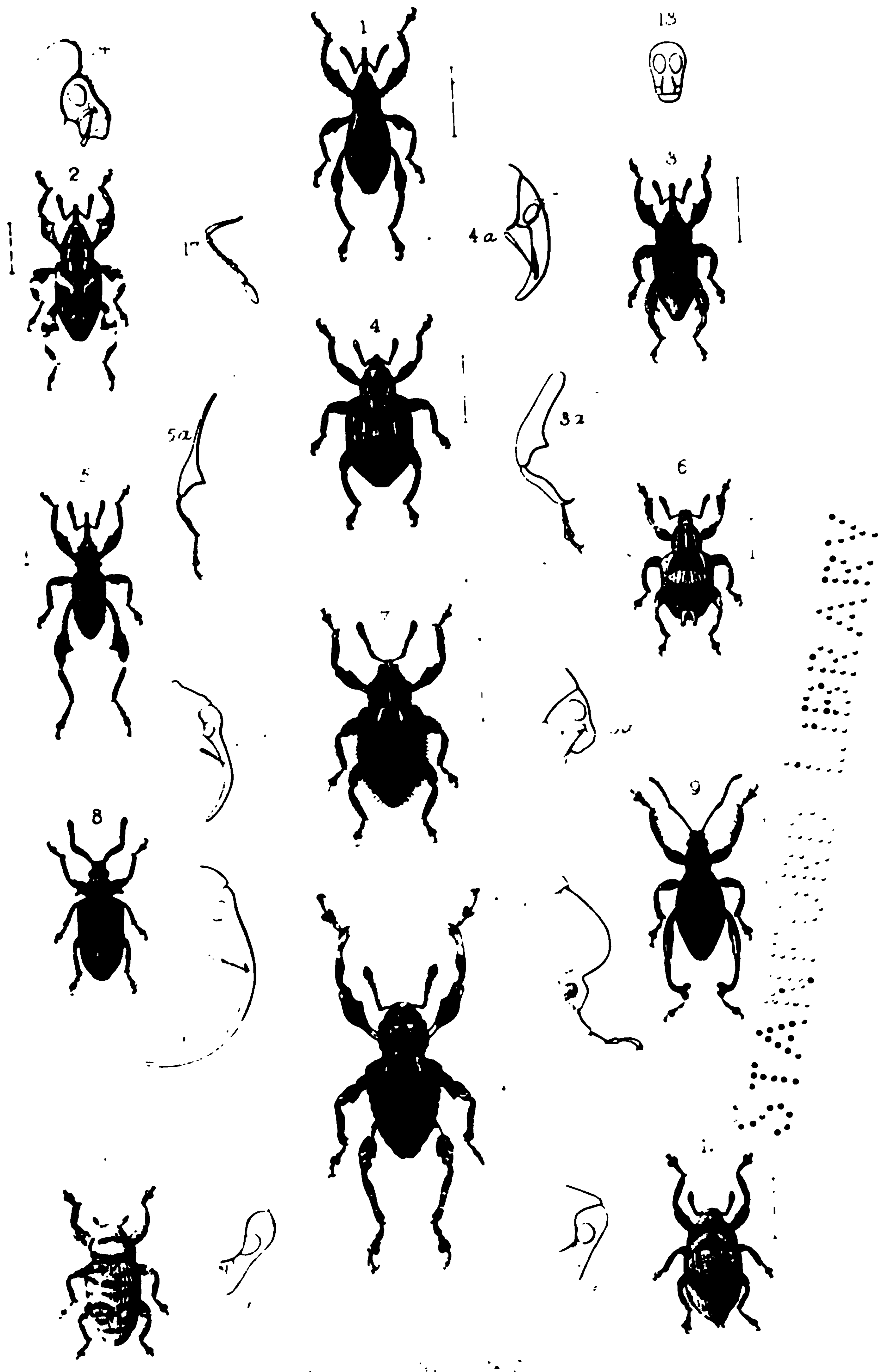
PLATE XIII.

Fig. 1. *Geolyrea nodifera*; 1 *a*, lateral view of the head; 1 *b*, ante

2. *Phanomerus notatus*; 2 *a*, hind leg.
3. *Peliobia geniculata*; 3 *a*, lateral view of the head.
4. *Polydus dumosus*; 4 *a*, lateral view of the head.
5. *Pithecomus ursulus*; 5 *a*, lateral view of the head.
6. *Eurypages pennatus.*
7. *Bebelatus aranea*; 7 *a*, lateral view of the head.
8. *Ixodicus occlusus*; 8 *a*, lateral view of the head; 8 *b*, fore tib
9. *Latychus rivulosus*; 9 *a*, front view of head.
10. *Dystirus strumosus*; 10 *a*, lateral view of head.
11. *Matrania palliata*; 11 *a*, lateral view of the head.
12. Lateral view of head of *Methyorrhina hispida.*
13. Lateral view of the head of *Ixodicus sordidus.*

ERRATUM.

Page 456, line 8 from bottom, for PELIEBIA read PELIO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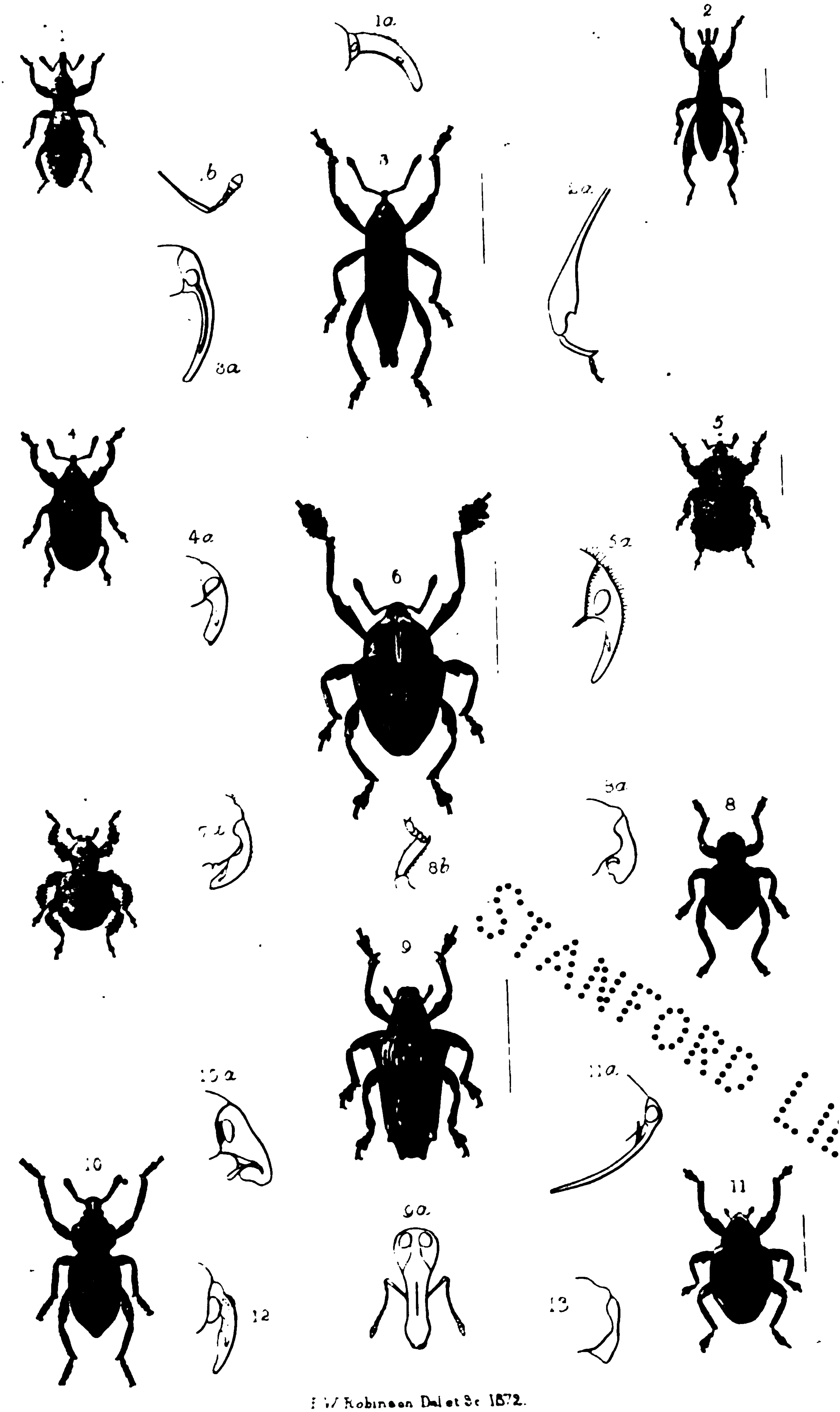


F. W. Robinson Del et Sc 1872.

Observations on the Cutaneous Exudation of the *Triton cristatus*, or Great Water-Newt. By Miss ELEANOR A. ORMEROD.

[Read June 6, 1872.]

MY attention having been drawn by occasional experiment during some years to the exudation of a viscid fluid accompanied by a strong poppy-like smell from the cutaneous pores of the Common Toad and the Great Water-Newt when under the influence of chloroform vapour, I was induced to examine more particularly into the phenomena connected with this exudation and its effects as shown by the latter (the *Triton cristatus*, or Great Water-Newt), so common in our ponds and ditches The few notes I offer are from observation of the reptiles in the spring, when in their fullest vigour.

In their natural state, and when undisturbed, the Tritons appear to be scentless; but on being alarmed or irritated, they emit an odour strongly resembling that of bruised poppy-heads, clearly perceptible in the open air, and sufficiently powerful to attract the attention of a person coming into a room in which they are being experimented on, the smell remaining for a considerable time on a hand which has been in contact with the irritated reptile. This scent appears to be given off equally by the Tritons at all stages of growth, from the smallest I have examined, which were about a sixth of the size of the full-grown reptile, to the adult male and female, the only case in which it was not plainly perceptible being that of a female so enormously distended by fluid as to be almost unable to move.

When kept in captivity and much disturbed, the scent and the disposition to give it off, save under great irritation, appear soon to decrease; but in partially dried specimens, such as one that may have escaped from the water and have harboured in a dry room till nearly dead, the poppy-like smell is exceedingly powerful and pungent.

On placing about fifteen or twenty of the Tritons, immediately after taking them from the water, under the influence of chloroform vapour, I found that a viscid liquid was exuded from the pores of the skin, collecting over the wet surface of the animal after death in a kind of slime—this slime forming a sticky deposit on the fingers touching the reptiles, and hardening as a kind of opaque and thick varnish, but not causing pain where the skin of the hand was uninjured, though trifling injuries existing or made

An analysis, made at my request, of the slimy exudation from the cutaneous pores of the Tritons showed its principal elements to be similar in composition to the serum of ordinary blood, and apparently separable from the blood under irritation at the will of the animal.

The enormous number of reptiles which would be required to ascertain the nature of the acrid principle contained in the exudation, throws much difficulty on the elucidation of this particular point; but the analyses, especially to discover the presence of any substance resembling the alkaloids of opium or aconite, showed matter having no alkaloidal character—the acrid and pungent constituent appearing neither acid nor alkaline, but neutral, and also highly volatile. In these characteristics the exudation from the tubercular skin of the Triton corresponds almost exactly with that from the follicles of the skin of the common Toad, as given by Dr. John Davy in his observations published in the Phil. Trans., where the exudation of the Toad is described as a thick yellowish fluid, very acrid, acting on the tongue like extract of aconite, but neither acid nor alkaline.

The effect of the poison when discharged immediately from the

skin of the Tritons upon the subject of experiment appeared usually to be far more powerful than when obtained artificially, and fully to justify the popular prejudice against these creatures. On the Tritons themselves the effect of the poison appeared to be painful and stupifying; in this case the poison could be thoroughly administered by obliging the specimen under experiment to open the mouth sufficiently to allow the tail of another to be repeatedly inserted between the jaws, where it would usually be held so firmly that the bitten one could be raised in the air suspended from the mouth of the biter. The results generally were:—first a small quantity of foam appearing round the jaws whilst attached to the bitten Newt; on being detached, the bitten one did not appear to suffer, but the biter to be in much discomfort, shown in various ways, by dilating the throat-pouches, snapping loudly with the jaws, rubbing the sides of the head as if to get rid of some adhering substance, and in one case by convulsions. The effect gradually passed away; and the circulation of the blood did not appear to be affected by it, save that in all the cases of the biting Newts which I examined, the circulation was rapid and continuous, whilst in about a quarter of the others, whether bitten or in their usual state, it appeared variable, occasionally almost entirely suspended locally, sometimes oscillatory (the blood-globules distinctly moving backwards and forwards) and returning suddenly in rapid continuous or in jerking flow.

On a strong and healthy cat being shown some of the Tritons (although recently well fed, so that he could have no inducement of hunger for attacking them), he immediately seized on them, and after gnawing them in various parts for about a minute dropped them, and was immediately attacked with a discharge of large drops of clear saliva from the mouth, followed by large strings of foam from the corners of the jaws, accompanied by violent and audible action of the jaws, as if to discharge some substance from the mouth.

On the human subject the effect appears much stronger. For the sake of exactly ascertaining the sensations (which in the lower animals could only be judged of by their apparent effects), a part of the back and tail of a live Triton were gently pressed between the teeth sufficiently to alarm the animal and cause it to give out its acrid cutaneous exudation. The first effect was a bitter astringent feel in the mouth, with irritation of the upper part of the throat, numbing of the teeth more immediately holding the rep-

dangerous, almost certainly exceedingly painful, in its action on the system.

To the Tritons themselves the exudation appears to act as a protection perfectly adapted to their needs as a defence against such enemies as they have most to fear from in their natural state: the spasmodic effect on the jaws, which would almost immediately ensure the Triton being dropped from the mouth of the attacking animal, joined to the temporary local pain and great discomfort, would (as far as experiment shows) be quite sufficient to distract attention from the reptile till it had time to conceal itself; and the effect as noticed by a casual passer-by would fully justify the common prejudice against the reptile, though harmless and inoffensive in its ordinary state.

On Diversity of Evolution under one set of External Conditions.

By Rev. JOHN T. GULICK.

[Read November 21, 1872.]

The terms "Natural Selection" and "Survival of the Fittest" present different phases of a law which can act only where there

I think the evolution of these different forms cannot be attributed to difference in their external conditions :—

1st. Because in different valleys, on the same side of the mountain, where food, climate, and enemies are the same, there is still a difference in the species.

2nd. Because we find no greater difference in the species when we pass from the more rainy to the drier side, than when we compare the forms from valleys on the same side of the mountain, separated by an equal distance.

3rd. Because if, failing to find a reason in the more manifest conditions, we attribute the difference in the species to occult influences, such as magnetic currents, we must suppose that there are important differences in these hidden conditions for each successive mile, and that their power at the Sandwich Islands is a thousand times greater than in most countries.

Separation and Variation Correlative Factors in the Evolution of Species.

If we would account for the difference and for the limited distribution of these allied forms on the hypothesis of Evolution

from one original species, it seems to me necessary to suppose two conditions, both of which relate to the state of the species—namely, Separation and Variation. I regard Separation as a condition of the species and not of surrounding nature, because it is a state of division in the stock which does not necessarily imply any external barriers, or even the occupation of separate districts. This may be illustrated by the separation between the castes of India or between different genera occupying the same locality.

To state the conditions more fully:—

1st. We must suppose that they possess or have possessed an inherent tendency to variation, so strong that all that is necessary to secure a divergence of types in the descendants of one stock is to prevent, through a series of generations, their intermingling with each other to any great degree. This supposition is not at variance, but rather in accordance, with facts that are observed in analogous cases in the history of man and of domestic animals of one original stock, that are kept entirely apart. But this condition alone would not be enough to account for the species of *Achatinellinæ* being confined to areas so much smaller than usual; for if this tendency has produced such results in the distribution of one family, why does it not in all?

Migration and Variation opposing Factors in the Limitation of Areas.

2nd. To account, therefore, for the small areas, we must further suppose that, as compared with other families, there is a disproportion between the tendency to variation and the tendency and opportunities to migrate. Either the tendency to variation in this family is very much greater than usual, or their tendency to migrate is weaker and their opportunities fewer than usual. According to *à priori* reasoning, the areas occupied must vary directly as the tendency, power, and opportunities for migrating, but inversely as the tendency to variation.

If the amount of migration is greatly expanded in proportion to the tendency to variation, the areas must be expanded; if, on the other hand, the tendency to variation is expanded as compared with the amount and extent of migration, the areas occupied by the different species must be correspondingly contracted.

If the power of migrating and the opportunities for being transported are very limited in any family of creatures, we may expect

competition of this kind does not tend to prevent variation, but rather to accelerate it, by driving portions of the race into new spheres. Supposing the animals first inhabiting the island to be a species of arboreal mollusks, there would soon be an excess of occupants on the trees best suited to them in the region where they first appeared. The portion of the population that would survive this exigency would, in the first place, be those that found sustenance on trees of other kinds. Some of these would either themselves, or through their descendants, reach localities where the trees are again found on which the stock commenced its career. Those that, in this way, returned to the original trees, would have acquired some new tendencies to variation through the ordeal through which they had passed; and those that remained upon the other kinds of trees would rapidly develop new characters: in either case, there would be no outside competition limiting them to one definite form. New forms of variation would

* The only terrestrial mollusks with which the *Achatinellinae* have to compete are a few *Helices* much inferior in size, and not arboreal in their habits.

have an opportunity of being preserved. New shades of colour, for example, would not expose the owners to the attacks of enemies. Variations of shape, if not inconsistent with the pursuit of food, would be no disadvantage.

3rd. *By continual Change in the Character of the Natural Selection.*—Still further, we can see that when competition arises from the *gradual* introduction of animals, either friendly or hurtful to the first occupants, the character of the Natural Selection, to which they would thus be subjected would be continually changing; no one set of characters would have constant advantage through a long series of successive generations.

In these ways the persistence of form might be impaired, and the variability which we may believe exists in some degree in all organisms might be greatly increased beyond what is usually found. This tendency to comparatively rapid variation having been established, the evolution of species would be correspondingly rapid, and the areas of each proportionately limited.

Imaginary Case, illustrating Evolution without change in the External Conditions.

If a bird should carry a leaf bearing two individuals of some species and drop it a mile beyond the limits already reached by others of that species, they might there find the same trees to which they were accustomed, and multiply for some tens of years before the first scattering individuals from the slowly advancing wave of migration would reach them. They might, by this time, have increased to many thousands; and having been entirely separated from the original stock for a considerable number of generations, with a preexisting tendency to rapid variation, a certain variety of form and colour might have partially established itself amongst them. The arrival of a few individuals representing the old stock would, amongst the multitudes of the new variety, have no influence in bringing back the succeeding generations to the original form. The new characters would become from year to year more distinctly set. Owing to an intervening ridge acting as a partial barrier, the number of individuals of the original stock coming amongst them might be always restricted; and even if no such barrier existed, the individuals arriving from abroad could never be more than a very small number compared with those produced on the spot and possessing the local characteristics.

otherwise be limited in their range and variable in their type. Natural Selection is as efficient in producing permanence of type in some cases as in accelerating variations in other cases.

If we suppose separation without a difference of external circumstances is a condition sufficient to ensure variation, it renders intelligible the fact that, in nearly allied forms on the same island, the degree of divergence in type is in proportion to the distance in space by which they are separated. The difference between two miles and ten miles makes no change in climate; but it is easy to believe that it is the measure of a corresponding difference in the time of separation. In forms that differ more essentially, the separation may have been as complete and as long-continued in the case of those which now inhabit one valley as in the case of those which are separated by the length of an island. When a wide degree of divergence has been established, hybridation would be precluded. We accordingly find that the difference between species of different genera or subgenera is in most instances equally great whether we take for comparison those from the same or from different valleys.

If, on the other hand, we suppose that a difference in the external conditions is necessary to the evolution of distinct forms, these and other similar facts remain unexplained.

Notes on *Keropia crassirostris*, Gml. ("Piopio").

By Thomas H. Potts, Esq., F.L.S.

[Read November 7, 1872.]

In writing on the natural history of our birds, the bewailment of their lessened numbers has come to be a matter of course. The rapid settlement of the colony, in the case of the Thrush, has limited its range greatly; few birds have retreated with so much haste before the efforts of the cultivator.

Let us take a section of this island, say a hundred miles in width (including Banks's Peninsula) and stretching from the eastern to the western shore; this will afford some information as to its present habitat.

Within this given range at one time the Piopio might be found in any bushy place not too far from water, where belts of shrubs afforded shelter and abundance of seeds; ten years at least have passed since we heard of its occurrence in this neighbourhood

son (well acquainted with birds' notes and calls) were frequently deceived, and have looked for a Red-bill till the Piopio disclosed himself by fluttering from bush to bush.

Its common song seems to be near akin to that of the Lark (*Anthus Novæ Zealandiæ*); it sounds two preludatory notes, then tinkles off a very brief song. When joyously flying in pursuit of the female, it utters a quick chi, chi, chit, chi, chi, chit. It marks its displeasure, or tries to intimidate intruders that approach its nest with a low purring churrr; both cock and hen join in this cry of anger. When singing, the effort is marked by the tail being spread, the wings held not quite close; the feathers of the breast and back are not raised, as in the case of the Bell-bird and some other arboreals.

We have called this Piopio a philosopher; he has quite as good a claim as many a biped to whom that title is accorded. Who doubts this, let him try to have some knowledge of this bird with the thick bill, not merely a know-him-by-sight acquaintance, but such a one as ripens into friendly intimacy; the result will be to know a bird that takes the world as it is, not fanciful as to the kind of food—that feeds with zest on insects when procurable, or can make shift on seeds, fruits, or even grasses—that neither courts nor avoids observation, is as bold as the Robin or Tit, without their intrusiveness—that in the presence of strangers coolly pursues its occupation without the prying of the Brown Creeper or the watchful distrust of the Popoketea—that defends his home with almost the courage of the Falcon or Tern.

It seems to delight in those openings which are found in river-beds, between long belts of tutu and other scrub; there it may be observed either hopping along the ground or fluttering about the lower sprays of shrubs, flying out to the spits of sand or drifted trees that lie stranded in the river; on some of the larger spits that are becoming clothed with vegetation it searches amongst the burry *Acæna*, snips off the fruit-stalks of moss, picking the seeds of some trailing *Veronica*.

Its progress on the ground is usually deliberate; it hops with both feet together, a slight flutter of the wings, a flirt of the tail accompanying each motion. When approached too closely, it leaves its perch by always descending at first, as though safer when near or on the ground; if it would rise on the wing, a momentum is gained by a succession of hops. In some of its habits one is reminded pretty often of the Wattle-bird (*Callæas*) Its

denticulated, but most strongly so at its rounded angle. *Teeth* in the outer row enlarged; a pair of small canines. *Fins*: pectoral as long as the head without the snout; caudal pointed. *Colours*: brownish, becoming golden below; fins dark-coloured.

Habitat. Bombay, where it is not uncommon during the cold season. It attains at least 8 inches in length.

Fam. CARANGIDÆ.

There appear to be found in Madras a large number of Horse-Mackerels whose existence in the seas of the Indian Empire is still unrecorded. This fact did not escape the observation of the late Dr. Jerdon, who, in the 'Madras Journal of Literature and Science' (No. 39 of 1851), observed, after referring to ten distinct species, "besides all these, I have drawings of at least twelve more of this genus, most of which have distinct native names; but I have not the means of verifying them just now. They abound at Madras, but are comparatively rare on the Malabar coast." Amongst these twelve were probably the *Caranx mate*, Cuv. and Val., *C. Bidii*, Day, *C. melanostethos*, Day, and *C. nigrescens*, Day. Amongst the remainder would seem to be the following:—

CARANX GYMNOSTETHOIDES, *Bleeker*.

A specimen about 18 inches in length is in the Madras Museum, which, however, has D. $8 \mid \frac{1}{30}$, A. $2 \mid \frac{1}{27}$, instead of D. $8 \mid \frac{1}{31}$, A. $2 \mid \frac{1}{25}$; and two more, which I procured from the Bazaars, were identical with the Museum one. *Caranx macrurus*, Bleeker, *C. malam*, Bleeker, *C. ire*, Cuv. and Val., *C. sansun*, Rüp., *C. chrysophryoides*, Bleeker, are all found in the sea at Madras.

HISTIOPHORUS BREVIROSTRIS, *Playfair*.

Two stuffed specimens, apparently identical with this species of Sword-fish, as described in the 'Fishes of Zanzibar,' exist in the Madras Museum. The longest is 4 feet 4 inches; they were obtained in Madras, where they are said to be not uncommon.

CYNOGLOSSUS MACROLEPIDOTUS, *Bleeker*.

This species of flatfish is common in Madras and on the Malabar coast.

CYNOGLOSSUS DUBIUS, sp. nov.

D. 110, V. 4, A. 88, C. 12, L. r. 104.

Length of head $\frac{1}{5}$, height of body $\frac{2}{7}$ of the total length. *Eyes*, diameter $\frac{1}{11}$ of length of head, $1\frac{1}{2}$ diameter apart; the upper eye very slightly

Fins: dorsal spine strong, not enveloped in skin, and having a few serrations posteriorly; it is as long as the head from the angle of the mouth; base of adipose dorsal equals that of the rayed fin; the pectoral almost reaches the ventral, its spine being four fifths as long as the head; it is not plaited inferiorly; the outer ventral rays are not enlarged, neither are they plaited; lower caudal lobe somewhat the longer. *Caudal peduncle* twice as long as high. *Skin* smooth. *Colours* yellowish, with dark bands; fins also yellow banded with black.

Habitat. Bowany river, at the base of the Neilgherry hills. Out of five specimens, the longest was 5 inches in length.

It differs from *G. striatum* more especially in the character of its dorsal spine.

SAURUS INDICUS, sp. nov.

B. XV. D. 13/0, P. 13, V. 9, A. 9, C. 19, L. l. 55, L. tr. 3½ | 7.

Length of head $\frac{2}{14}$, of caudal $\frac{2}{11}$, height of body $\frac{1}{15}$ of the total length. *Eyes*, diameter $\frac{2}{7}$ of the length of the head, rather above ½ diameter from end of snout, and 1 diameter apart. Width of snout equals its length. Interorbital space somewhat concave. Internal half of frontal bone corrugated, as is also the occipital, with smooth interspaces between the striæ. Upper jaw slightly the longer. *Teeth*, a

been found almost at the extremities of Europe; two are from near Aberdeen, in Scotland, four from Corfu, two from the south of France, one from near Naples, one from Ischl, one from Bruck-am-Main, in Austria, and one from Switzerland. They belong to eleven genera, some of them widely distant from each other. Sketches are added, either of the whole or of portions of each species, from which it is hoped that the often minute, but generally satisfactory, distinctive characteristics of each species may be more easily perceived than from descriptions alone. The figures are not drawn to any particular scale; but a line is in each case added showing the natural length of the spider independently of its legs.

List of species, with references to page, Plate and figures.

Œcobius ionicus, ♂. Corfu. p. 531, Pl. XIV. fig. 1.
Ariadne ionica, ♂. Corfu. p. 532, Pl. XIV. fig. 2.
Clubiona voluta, ♀. Aberdeen. p. 533, Pl. XIV. fig. 3.
Dictyna lugubris, ♂, ♀. Corfu. p. 535, Pl. XIV. fig. 4.
Calotes Pickardi, ♂. Switzerland. p. 537, Pl. XIV. fig. 5 a, d.
Textrix Moggridgii, ♀. Mentone. p. 537, Pl. XIV. fig. 6.
Linyphia lepida, ♀. Dunkeld. p. 539, Pl. XV. fig. 7.

Family DYSDERIDES.

Genus Ariadne (Savigny).

Ariadne ionica, sp. n. Pl. XIV. fig. 2.

Adult male, length 3 lines.

The whole of the fore part of this spider (except the labium and sternum, which are strongly suffused with dark brown) is of a brownish-yellow colour, the abdomen being dull drab-yellow, strongly suffused above with a warm reddish brown, but without (at least in the example described) showing any pattern or design.

The *cephalothorax* is oval, truncate before, very slightly constricted laterally in front, and rather flattened above, the caput and thorax being of the same elevation; it is (if any thing) a little darker in colour than the legs, and is narrowly margined with dusky brown: the normal grooves and indentations are but slightly marked; the surface is glossy, but (apparently) marked thinly with small round punctures.

The *eyes* are six in number, placed in three pairs very near the fore margin of the caput; those of the central pair are contiguous to each other; and those of each lateral pair are also contiguous to each other, and placed obliquely on a tubercle, the two hind laterals being in a straight line with those of the central pair.

Legs rather long, moderately strong; their relative length is 1, 2, 4, 3; they are of a pale greyish-yellow colour, washed or roughly striped (longitudinally) with white, and spotted with black; they are furnished with hairs; and the femora of the first pair, as also the tibiæ and metatarsi of the third and fourth pairs, have some fine longish spines; each tarsus ends with two black curved claws.

The *falces* are greyish yellow, speckled with black, they project forwards, and are moderately long and strong, but apparently rather excavated where they meet the *maxillæ*; these are long, narrow, a little curved, and inclined to the labium, which is of an oblong-oval form, round-pointed at its apex.

The *sternum* is heart-shaped, flattened, of a yellowish colour, mottled with white, and closely spotted with blackish spots.

The *abdomen* is (looked at from above) broader behind than before, and of a somewhat pentagonal form; its fore part projects greatly over the base of the cephalothorax; and from its hinder part rises a large eminence directed backwards and just over the end of the abdomen, and furnished above with black spines; the sides are strongly and longitudinally rugulose; and the whole has a wrinkled shrunken appearance: the colour of the abdomen is a mixture of dark and grey, white, greenish yellow-brown, and reddish yellow; a faint indication of a broadish, longitudinal, central, dentated band of a paler hue may be traced on the upperside; and the underside is of a dull whitish hue, with a broad, black-brown, longitudinal, central band.

Two examples (scarcely adult) were most kindly given me by H. T. Stainton, Esq., by whom they were captured, with some other interesting species, at Cannes, in the early spring of 1867; and it is with great pleasure that I connect his name with this very distinct and, I believe, undescribed spider.

Genus Thanatus (Koch).

Thanatus (Philodromus, *Walck.* ad partem) mundus, sp. n. Pl. XV. fig. 11.

Adult female, length $2\frac{3}{4}$ lines.

In form, colours, and general appearance, this spider is very like *T. setigerus* (Cambr.) found in Palestine; it is, however, larger, and differs in the form of the characteristic central, longitudinal, lanceolate marking on the fore part of the upperside of the abdomen; in the present species this marking terminates posteriorly in a narrow acute point, and is considerably and obtusely enlarged on each side at about its middle part, while in *T. setigerus* it is cut off behind in a straight transverse line, and the sides are merely very slightly angular.

The *cephalothorax* is clothed with hairs; and, looked at from above, is nearly round, the caput being produced at its fore part below; so

nearest to it.

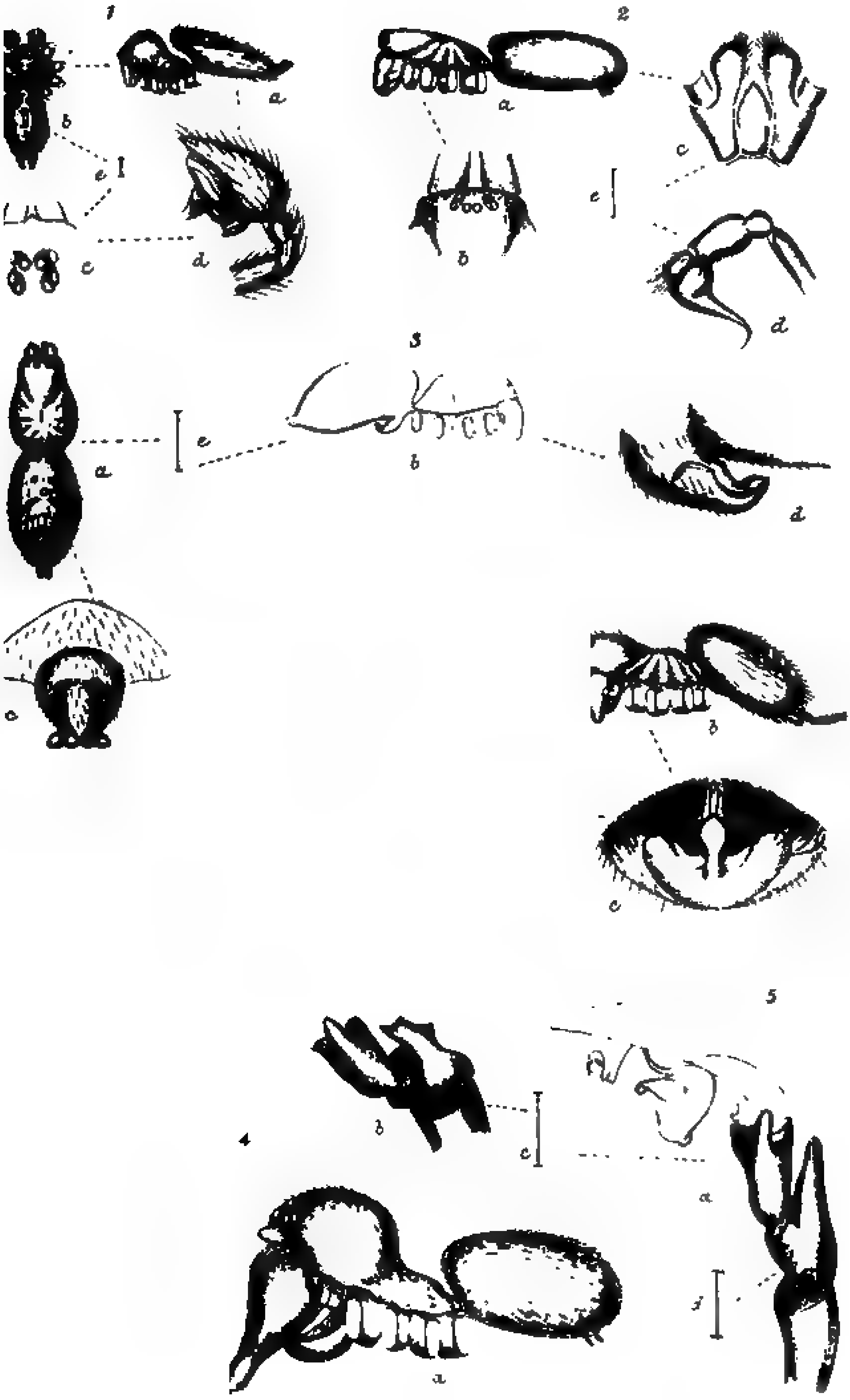
The *legs* are long and tolerably strong; their relative length appeared to be 2, 4, 1, 3; they are of a brownish-yellow colour, furnished with hairs, black bristles, and spines, the finer hairs having a whitish hue; each tarsus terminates with two black curved claws and a claw-tuft beneath them.

The *palpi* are moderately long and similar in colour and armature to the legs.

The *falces* are moderate in length and strength, of a pale yellow-brown colour, and furnished on their uppersides with a few longish, prominent black bristles.

The *maxillæ*, *labium*, and *sternum* are normal in form; they are of a yellow colour tinged with brown, and furnished with black bristles.

The *abdomen* is oval, moderately convex above, of a greyish yellow-brown colour, dotted with hairs and spiny bristles; of the former there are many of a pale colour and squamose nature, mostly disposed rather in tufts or groups on the hinder part and sides; the spiny bristles are prominent, strong, and obtuse at their extremities; most of those on the middle and towards the fore part of the upperside are black; those on the sides and hinder portion are for the most part whitish and diaphanous: on the fore part of the upperside, in the central longitudinal line, is a strong and conspicuous, nearly black, velvety-looking



O.P. Cambridge delt.
A.T. Hollick lith.

W. West & Co. imp.

marking, narrowly margined with whitish, obtusely enlarged on either side a little past its middle point; and its hinder extremity draws in suddenly, and then terminates narrowly, tapering to a sharp point; from either corner, where it draws in, there is an oblique, short, dark dash, forming the anterior boundary of a broad tapering band, which reaches to the spinners, and is of a dark yellow-brown colour, having several deeper angular lines along its middle; the sides and underside are brownish yellow, the former rather the darkest. The genital aperture is of a somewhat oblong form, wider behind than in front, with dark, shining, reddish-brown, lateral margins.

The armature of the abdomen will distinguish this spider at once from *Philodromus* (*Araneus*) *formicinus* (Clk.), as also will the form of the large marking on the fore part of the upperside as well as the character of the other markings; it has no lateral black or dark patch, as in *P. setigerus*, from which also other peculiarities (as above noticed) separate it.

A single example of this very interesting spider was kindly brought to me from Mentone in March 1867 by H. T. Stainton, Esq.

Genus PHILODROMUS (Walck.).

PHILODROMUS TORQUATUS, sp. n. Pl. XV. fig. 12.

Adult male, 1¾ line.

This species is allied to *P. aureolus* (Walck.), but its much smaller size, as well as its strikingly different colours and the structure of the palpi, will serve to make it easily distinguishable in the adult state.

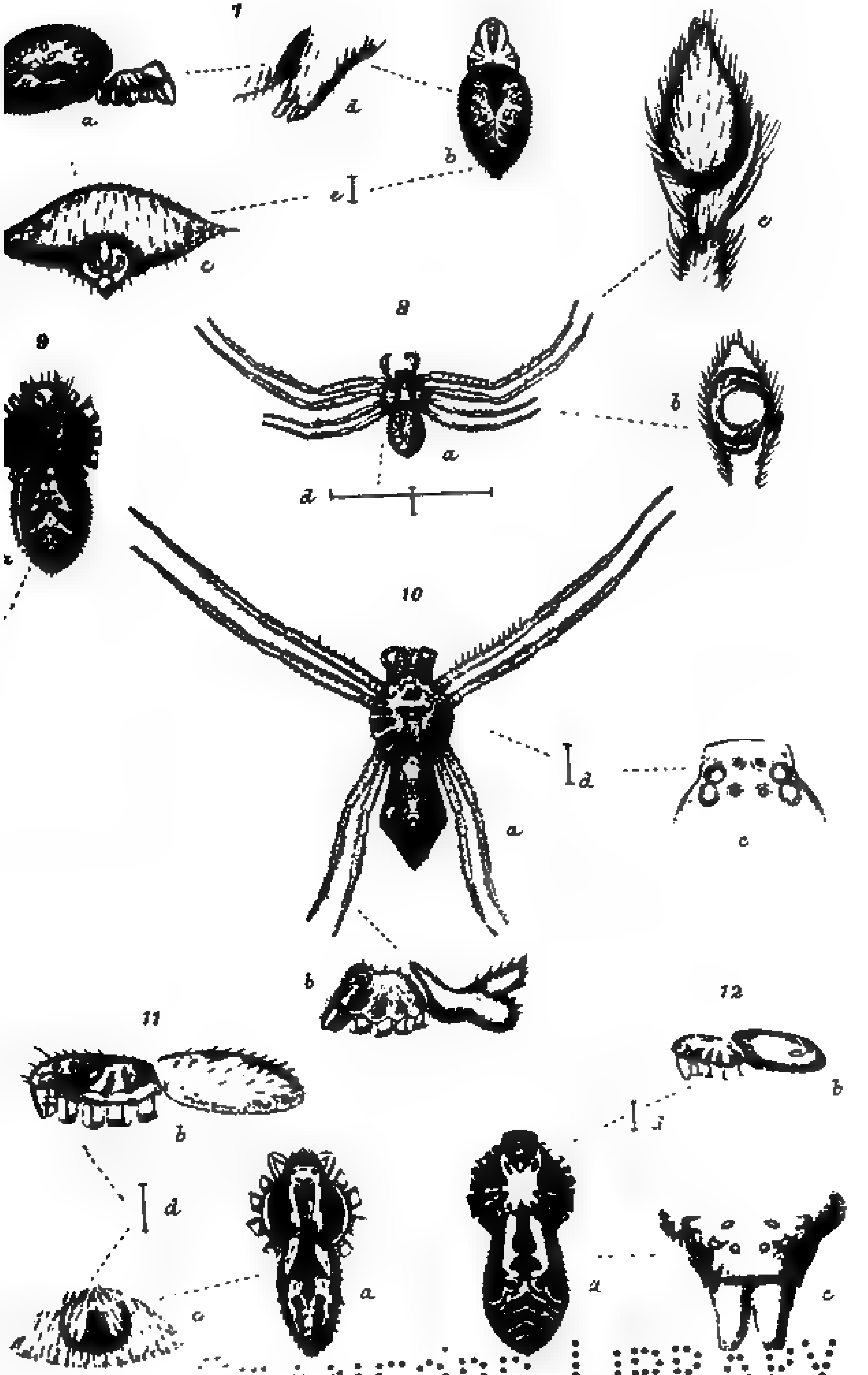
The *cephalothorax* is of the ordinary form, the clypeus projecting and exceeding in height half that of the facial space: the sides and clypeus are of a deep, rich, black chestnut-brown, leaving a broad longitudinal space on the upperside; the hinder half of the space is of a brownish-yellow colour, slightly mottled with a darker line; on the fore half there is a large crescent-formed, collar-like, pale cream-coloured marking; its convexity is directed backwards; and it has two dark blotches, one near each horn of the crescent, and two small dark spots in a short transverse line near its hinder extremity; between this and the eyes the colour is like that of the eye-area and clypeus, with a pale brownish-yellow band along the middle, having its posterior termination in the extreme concavity of the crescent above mentioned; this band has on it two parallel, longitudinal, dark-brown lines.

The *eyes* are small, very nearly of equal size, and in the ordinary position, but forming a rather narrower (and so longer) crescent-formed figure; six of them form a long transverse curved row; and between the two extreme eyes of this row, but within the straight line formed by them, are two more; these two are further from each other

upperside is a large oblong white patch, along the longitudinal centre of which is the ordinary characteristic marking, of a larger size than usual, its sides irregularly notched or dentate, and its colour as dark as that of the cephalothorax; towards the hinder part of the sides of the abdomen are a longitudinal series of three curved, narrow, white bars, each one decreasing in length and strength behind the other; between these, along the middle of the hinder part of the abdomen are three curved, pale greyish, obscure, angular bars or chevrons; immediately behind the oblong white patch on the fore part, and in a transverse line, are two largish circular depressions of a deeper hue than the rest of the surrounding surface; the underside is rather paler than the upperside, and has some obscure, pale, longitudinal, broken, parallel lines; the spiracular plates are cream-coloured.

Probably the females and immature, or lately matured, males will be found to approach very nearly in colour and markings to *P. aureolus* and *P. cespiticolis*.

Two adult males were found by myself on low plants at Corfu in May 1865.



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EXPLANATION OF PLATES XIV. & XV.

Fig. 1. *Œcobius ionicus*, sp. n., ♂.
a, spider, in profile, without legs; *b*, ditto, from above; *c*, eyes, from behind and above; *d*, left palpus, from the outer side, rather in front; *e*, natural length of spider.

Fig. 2. *Ariadne ionica*, sp. n., ♂.
a, spider, in profile; *b*, caput, showing eyes; *c*, maxillæ and labium; *d*, left palpus, from outer side; *e*, natural length of spider.

Fig. 3. *Clubiona voluta*, sp. n., ♀.
a, spider (without legs), from above; *b*, ditto, in profile; *c*, *d*, epigyne, from above and in profile; *e*, natural length of spider.

Fig. 4. *Dictyna lugubris*, sp. n., ♂.
a, spider, in profile; *b*, caput and falces, from the front; *c*, left palpus, from the front; *d*, natural length of spider.

Fig. 5. *Cœlotes Pickardi*, ♂.
a, left palpus, from outer side; *d*, natural length of spider; *b*, left palpus, from outer side, of a closely allied species (*Cœlotes saxatilis* (Bl.); *c*, natural length of spider.

Fig. 6. *Textrix Moggridgii*, sp. n., ♀.
a, spider, from above; *b*, ditto, in profile, with legs truncated; *c*, genital aperture; *d*, natural length of spider.

Fig. 7. *Linyphia lepida*, sp. n., ♀.
a, spider in profile; *b*, ditto, upperside; *c*, *d*, genital aperture and epigyne, from above and in profile; *e*, natural length of spider.

Fig. 8. *Xysticus Pavesii*, sp. n., ♂.
a, spider, from above; *b*, left palpus, from underneath; *c*, right palpus, from above and behind; *d*, dimensions, showing natural length and extent of legs.

Fig. 9. *Xysticus defectus*, sp. n., ♂.
a, spider, upperside; *b*, left palpus, from above; *c*, natural length of spider.

Fig. 10. *Monastes Staintoni*, sp. n., ♀.
a, spider, from above; *b*, ditto, in profile, with legs truncated; *c*, fore part of caput and eyes, from above and behind; *d*, natural length of spider.

Fig. 11. *Thanatus mundus*, sp. n., ♀.
a, spider, from above, legs truncated; *d*, ditto, in profile; *c*, genital aperture; *d*, natural length of spider.

Fig. 12. *Philodromus torquatus*, sp. n., ♂.
a, spider, from above, legs truncated; *b*, ditto, in profile; *c*, caput and falces, from the front, showing the eyes; *d*, natural length of spider.

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ADDITIONS

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TITLES. DONORS.

ACADEMIES AND SOCIETIES.

Adelaide:—

Botanic Garden. See **Schomburgk,** *R.*

Philosophical Society.

Annual Report and Transactions for the year ending Sept. 30, 1869. 4to. Adelaide, 1870. C. A. WILSON, Esq.

Amsterdam:—

Kon. Akademie van Wetenschappen.

Verslagen en Mededeelingen. Afdeeling Natuurkunde. 2de Reeks, 4de Deel. 8vo. Amsterdam, 1870.

—— ——. Afd. Letterkunde. 12de Deel. 8vo. *Ibid.*, 1869

Jaarboek voor 1869. 8vo. *Ibid.*

Processen-Verbaal van de gewone Vergaderingen der Akademie, van Mei 1869–April 1870 (1869–70, Nos. 1–10). 8vo. *Ibid.* THE ACADEMY.

Batavia:—

Bataviaasch Genootschap van Kunsten en Wetenschappen.

Verhandelingen. Deel 33. 4to. Batavia, 1868.

TITLES. DONORS.

ACADEMIES AND SOCIETIES (*continued*).

Boston, Mass.:—

American Academy of Arts and Sciences.

Proceedings. Vol. 8, sheets 1–17. 8vo. Boston (1869).

THE ACADEMY.

Society of Natural History.

Proceedings. Vol. 12, sheets 18–27, and vol. 13, sheets 1–14. 8vo. Boston, 1869–70. THE SOCIETY.

Separate publications. See **Agassiz,** *Louis*, & **Gould,** *A. A.*

Bremen:—

Naturwissenschaftlicher Verein.

Abhandlungen. Band 2, Heft 2. 8vo. Bremen, 1870.

THE ASSOCIATION.

Breslau:—

Schlesische Gesellschaft für vaterländische Cultur.

Abhandlungen. Abtheilung für Naturwissenschaften und Medicin, 1869–70. 8vo. Breslau, 1870.

Jahresbericht 47. 8vo. *Ibid.* 1870. THE SOCIETY.

Brünn:—

Naturforschender Verein.

Verhandlungen. Band 7. 8vo. Brünn, 1869.

THE ASSOCIATION.

Brussels:—

Société R. de Botanique de Belgique.

Bulletin. Tome 9, Nos. 1 & 2. 8vo. Bruxelles, 1870.

THE SOCIETY.

Société Entomologique de Belgique.

Annales. Tome 13. 8vo. Bruxelles, 1869–70.

THE SOCIETY.

Buenos Ayres:—

Museo Público.

Anales: por German Burmeister, M.D. Entrega 7 (=Tomo 2, Entr. 1). 4to. Buenos Aires, 1870. THE EDITOR.

Calcutta:—

Asiatic Society of Bengal.

Journal. New Series, vol. 39, Nos. 160–62. 8vo. Calcutta, 1870.

Kongl. Danske Videnskabernes Selskab.

Skrifter. 5te Række. Naturvid. og Mathemat. Afdeling. Bind 8, Hft. 6 & 7, & Bd. 9, Hft. 1–4. 4to. Kjöbenhavn, 1869–70.

Oversigt over det Kgl. D. V. S. Forhandlinger, &c. 1868, No. 6, 1869, Nos. 3 & 4, and 1870, Nos. 1 & 2. 8vo. *Ibid.* 1868–70. THE SOCIETY.

Devonshire:—

Association for the Advancement of Science, &c.

Report and Transactions. Vol. 4, Pt. 1. Plymouth, 1870. THE ASSOCIATION.

Dublin:—

Royal Dublin Society.

Journal. No. 39, completing vol. 5. 8vo. Dublin, 1870. THE SOCIETY.

Edinburgh:—

Botanical Society.

Transactions and Proceedings. Vol. 10, Pt. 2. 8vo. Edinburgh, 1870. THE SOCIETY.

TITLES. DONORS.

CADEMIES AND SOCIETIES (*continued*).

Edinburgh (*continued*):—

Royal Society.

Transactions. Vol. 26, Pt. 1 (for the Session 1869–70). 4to. Edinburgh (1870).

Proceedings. Session 1869–70. (Vol. 7, Nos. 80 & 81.) 8vo. *Ibid.* THE SOCIETY.

Scottish Arboricultural Society.

Transactions, edited by John Sadler, F.R.P.S., Secretary. Vol. 6, Pt. 1, 8vo. Edinburgh, 1871. THE EDITOR.

Frankfurt a. M.:—

Senckenbergische Naturforschende Gesellschaft.

Abhandlungen. Band 7, Hft. 3 & 4. 4to. Frankfurt a. M., 1870.

Bericht, 1869–70. 8vo. *Ibid.* 1870. THE SOCIETY.

Geneva:—

Société de Physique et d'Histoire Naturelle.

Mémoires. Tome 20, partie 2. 4to. Genève, 1870. THE SOCIETY.

Haarlem:—

Société Hollandaise des Sciences.

Archives Néerlandaises des Sciences Exactes et Naturelles, rédigées par E. H. von **Baumhauer**, &c. Tome 5, Livr. 1–3. 8vo. La Haye, 1870. THE SOCIETY.

Hague:—

Nederlandsche Entomologische Vereeniging. (See **Leyden.**)

Halifax, N. S.:—

Nova Scotian Institute of Natural Science.

Proceedings and Transactions. Vol. 2, Pt. 4. 8vo. Halifax, N. S., 1870. THE INSTITUTE.

Hanover:—

Naturhistorische Gesellschaft.

Jahresbericht, 18, 19, & 20. 4to. Hannover, 1869–70. THE SOCIETY.

1870.

Administration Report of the Sind Forest Department for 1869–70. 8vo. Bombay, 1870.

THE SECRETARY OF STATE FOR INDIA.

Kazan:—

University.

Izvestia i Utchenia Zapiski, &c. Pts. 1 & 2 for 1864, Pt. 6 for 1865, Pts. 1–6 for 1866, Pts. 1–6 for 1867, Pts. 1 & 2 for 1868, and Pts. 1–4 for 1869. 8vo. Kazan, 1866–69.

THE UNIVERSITY.

Königsberg:—

Königl. Physikalisch-ökonomische Gesellschaft.

Schriften. Jahrg. 8, 9 und 10. 4to. Königsberg, 1867–69.

THE SOCIETY.

Leeds:—

Philosophical and Literary Society.

Report (50th Annual) for 1869–70. 8vo. Leeds, 1870.

THE SOCIETY.

TITLES. DONORS.

ACADEMIES AND SOCIETIES (*continued*).

Leyden :—

Nederlandsche Entomologische Vereeniging.

Tijdschrift voor Entomologie. Serie 2, Deel 4, Aflev. 2, Deel 5, Afl. 2–6, & Deel 6, Afl. 1. 8vo. Gravenhage, 1869–71. THE ASSOCIATION.

London :—

Clinical Society.

Transactions. Vol 3. 8vo. London, 1870. THE SOCIETY.

Entomological Society.

Transactions. Parts 2–5 for 1870. 8vo. London, 1870. THE SOCIETY.

Geological Society.

Quarterly Journal. Vol. 26, Pts. 3 & 4, and Vol. 27, Pts. 1 & 2. 8vo. London, 1870–71. THE SOCIETY.

London Institution.

Journal. Vol. 1, Nos. 1–6. 8vo. London, 1871. THE INSTITUTION.

Palæontographical Society's Publications, Vol. 24. 4to, London, 1871 (including):—

1. **Binney,** *E. W.* Flora of the Carboniferous Strata. Part 2.
2. **Davidson,** *Thomas.* British Fossil Brachiopoda. Part 7, No. 4 (Silurian).
3. **Owen,** *Richard.* Fossil Mammalia of the Mesozoic Formations.
4. **Wood,** *S. N.* Monograph of Eocene Mollusca, Part 4, No. 3 (Bivalves).
5. **Wright,** *Thomas.* Monograph of the British Fossil Echinodermata from the Cretaceous Formations. Vol. 1, Pt. 4. PURCHASED.

Pharmaceutical Society.

Pharmaceutical Journal and Transactions. 3rd Series, Vol. 1, Nos. 1–50. 8vo. London, 1870–71. THE SOCIETY.

Quekett Microscopical Club.

Journal. Nos. 11–14. 8vo. London, 1870–71.

Report, 5th, and List of Members. 8vo. *Ibid.*, 1870. THE CLUB.

TITLES. DONORS.

ACADEMIES AND SOCIETIES (*continued*).

Maine, U. S.:—

Reports, for 1867, 1868, and 1869, of the Commissioners of Fisheries of the State of Maine. 8vo. Augusta, 1869–70.
THE PORTLAND SOCIETY OF NATURAL HISTORY.

Malvern:—

Naturalists' Field Club.

Transactions (Vol. 1), 1853–70. Pts. 1–3. 8vo. Worcester, 1870. EDWIN LEES, Esq., F.L.S.

Montreal:—

Natural History Society.

Canadian Naturalist and Quarterly Journal of Science. New Series. Vol. 5, Nos. 1–3. 8vo. Montreal, 1870–71.
THE SOCIETY.

Moscow:—

Société Impériale des Naturalistes.

Bulletin. Tome 43, Nos. 1 & 2. 8vo. Moscou, 1870.
THE SOCIETY.

Nouveaux Mémoires. Tom. 2 (Tome 8 de la Collection). 4to. *Ibid.*, 1832. PURCHASED.

Munich:—

Kön. Bayerische Academie der Wissenschaften.

Abhandlungen der Mathem.-physikal. Classe. Band 10, Abth. 3. 4to. München, 1870.

Sitzungsberichte. 1870. Band 1, Hft. 2–4, und Band 2, Hft. 1. 8vo. *Ibid.*, 1870. THE ACADEMY.

Newcastle-on-Tyne:—

Natural History Society of Northumberland and Durham.

Transactions. Vol. 3, Pt. 2. 8vo. London, 1870.
THE SOCIETY.

TITLES. DONORS.

ACADEMIES AND SOCIETIES (*continued*).

Regensburg :—

Kön. Bayerische Botanische Gesellschaft.

Flora. Neue Reihe. Jahrg. 28, Nos. 12–31, und Jahrg. 29, Nos. 1–10. 8vo. Regensburg, 1870–71.

PURCHASED.

Rugby :—

Rugby School Natural History Society.

Report for the year 1870. 8vo. Rugby, 1871.

DR. KITCHENER, F.L.S.

Salem, Mass. :—

Essex Institute.

Bulletin. Vol. 1. 8vo. Salem, 1869–70.

Proceedings and Communications. Vol. 6, Pt. 1 (1868). 8vo. *Ibid.*, 1870.

Act of Incorporation, Constitution, and By-laws. 8vo. *Ibid.*, 1855.

Historical Notice, By-laws, &c. 8vo. *Ibid.*, 1866.

Record of American Entomology, for the year 1868. Edited by A. S. Packard, Jun., M.D. 8vo. *Ibid.*, 1869.

THE INSTITUTE.

Peabody Academy of Science.

American Naturalist. Vol. 3 (Nos. 1–12), and Vol. 4, Nos. 1 & 2. 8vo. Salem, Mass., 1869–70.

Annual Report (1st) of the Trustees. 8vo. *Ibid.*, 1869.

THE ACADEMY.

Stockholm :—

Kongl. Svenska Vetenskaps-Akademien.

K. S. Fregatten 'Eugenie's' resa omkring Jorden, under Befäl af C. A. Virgin, åren 1851–53, Häft 12. Zoologie, No. 6, Insekten. 4to. Stockholm, 1868.

THE ACADEMY.

Strasburg :—

Société des Sciences Naturelles.

Bulletin. 2 Année, Nos. 8–10. 8vo. Strasburg, 1869.

THE SOCIETY.

TITLES. DONORS.

ACADEMIES AND SOCIETIES (*continued*):—

Vienna (*continued*):—

Kaiserl. Akademie der Wissenchaften. Math. Nat. Classe.

Anzeiger, Jahrg. 7, Nos. 13–29, & Jahrg. 8, Nos. 1–6 & 10–14. 8vo. *Ibid.*, 1870–71. THE ACADEMY.

Reise der Œsterreichischen Fregatte 'Novara' um die Erde in 1857–9, &c.

Botanischer Theil. Band 1.—1. Flechten, bearbeitet von A. v. Krempelhüber.—2. Pilze Leber- und Laubmoose, von Dr. H. W. Reichardt.—3. Gefäss-Kryptogamen, von Dr. Georg Mettenius.—Ophioglosseen & Equisetaceen von Dr. Jul. Milde. 4to. Wien, 1870. PURCHASED.

K. K. Geologische Reichs-Anstalt.

Abhandlungen. Band 4, Abth. 9 & 10. (=**Hornes,** *M.*, **Moritz,** *Dr.*, & **Reuss,** *A. E.* Fossilen Mollusken des Tertiär-Beckens von Wien, Bd. 2, Nos. 9 & 10.) 4to. Wien, 1870.

Jahrbuch. Bd. 19, No. 2, & Bd. 20 (Nos. 1–4). 8vo. *Ibid.*, 1869–70.

Verhandlungen. Jahrg. 1869, Nos. 6–9, & J. 1870 (Nos. 1–18). 8vo. *Ibid.* THE INSTITUTE.

K. K. Zoologisch-Botanische Gesellschaft.

Verhandlungen. Band 20. 8vo. Wien, 1870. THE SOCIETY.

Warwickshire:—

Natural History and Archæological Society.

Annual Report (34th). 8vo. Warwick, 1870. THE SOCIETY.

Washington:—

Smithsonian Institution.

Smithsonian Contributions to Knowledge. Vol. 16. 4to. Washington, 1870.

—— Miscellaneous Collections. Vols. 8 & 9. 8vo. *Ibid.*, 1869.

Annual Report of the Board of Regents for 1868. 8vo. *Ibid.*, 1869. THE INSTITUTION.

Wiesbaden:—

Nassauischer Verein für Naturkunde.

Jahrbücher. Jahrg. 21 & 22. 8vo. Wiesbaden, 1867–68. THE ASSOCIATION.

TITLES. DONORS.

Journals (*continued*):—

Giornale (Nuovo) Botanico Italiano. Pubbl. da Od. Beccari. Vol. 2, Nos. 3 & 4, and Vol. 3, Nos. 1 & 2. 8vo. Firenze, 1870–71. THE EDITOR.

Ibis; a Quarterly Journal of Ornithology. New Series: edited by Alfred Newton, M.A., F.L.S. &c. (Vol. 6.) Nos. 23 & 24. 8vo. London, 1870.

——. 3rd Series: edited by Osbert Salvin, M.A., F.L.S. Nos. 1 & 2. 8vo. *Ibid.*, 1871. PURCHASED.

Jahrbücher für wissenschaftliche Botanik: herausgegeben von Dr. N. Pringsheim. Band 7, Heft 4. 8vo. Leipzig, 1870. PURCHASED.

Journal of the Quekett Microscopical Club. See ACAD. &c. **London.**

Journal de Conchyliologie; publié sous la direction de MM. Crosse et Fischer. 3e Série, Tome 10, No. 3. 8vo. Paris, 1870. PURCHASED.

Journal of Botany, British and Foreign: edited by Berthold Seemann, Ph.D., F.L.S. &c., assisted by J. G. Baker, F.L.S., and H. Trimen, M.B., F.L.S. Nos. 91–102. 8vo. London, 1870–71. PURCHASED.

Linnæa: ein Journal für die Botanik: herausgegeben von Dr. Aug. Garcke. Neue Folge, Band 2, Heft 4–6, und Band 3, Heft 1. 8vo. Berlin, 1870–71. PURCHASED.

Malakozoologische Blätter; als Fortsetzung der Zeitschrift für Malakozoologie; herausgegeben von Dr. Louis Pfeiffer. Band 16, Bogen 13–16, Bd. 17, Bog. 1–9, und Bd. 18, Bog. 1–3. 8vo. Cassel, 1869–71. PURCHASED.

Monthly Microscopical Journal. See ACADEMIES &c. **London,** R. Microscopical Society.

Nature: a weekly illustrated Journal of Science. Nos 33–84. 8vo. London, 1870–71. THE PUBLISHER.

Naturhistorisk Tidsskrift; stiftet af Henrik Kroyer; udgivet af Prof. J. C. Schiödte. Række 3. Bind 1–5, und Bd. 6, Hft. 1 & 2. 8vo. Kjöbenhavn, 1861–69. THE EDITOR.

Nederlandsch Kruidkundig Archief: onder redactie van W. F. R. Suringar en M. J. Cop. Deel 5, Stuk 4. 8vo. Leeuwarden. PURCHASED.

Nuovo Giornale. *See* Giornale.

Zeitschrift für wissenschaftliche Zoologie: herausgegeben von C. T. von Siebold und Albert Kölliker. Band 20, Heft 4. und Bd. 21, Hft. 1. 8vo. Leipzig, 1870. PURCHASED.

Zoologist: edited by Edward Newman, F.L.S. 2nd Series, Nos. 58–69. 8vo. London, 1870–71. PURCHASED.

Agassiz, *Louis.* Address delivered on the Centennial Anniversary of the birth of Alexander von Humboldt. 8vo. Boston, 1869. BOSTON NATURAL HISTORY SOCIETY.

Allemão, *F. F.*, **Serrão,** *A.*, **Netto,** *Lad.*, &c. Breve Noticia sobre a Collecção das Madeiras do Brasil (Bois du Brésil) apresentada na Exposição Internacional de 1867. 8vo. Rio de Janeiro, 1867. DR. L. NETTO.

[**Andreini,** *R.*] Anthropologie. Analyse des deux mémoires de G. B. Ercolani sur la structure, la fonction, &c. du placenta des Mammifères; et de la Thèse d'Ed. Bruch sur l'appareil de la génération chez les Selaciens. 4to. (Alger, Juin, 1870.) —— ?

Atkinson, *Edward.* On some points of Osteology of the Pichi-

TITLES. DONORS.

ciégo (*Chlamydophorus truncatus*, Harlan). 8vo. (Journ. Anat. and Phys., vol. 5.) 1870. THE AUTHOR.

Audouin, *Ed.* Annales des Sciences Nat. See **Journals.**

Baillon, *H.* Histoire des Plantes. Tome 2, Fam. 10–12, completing vol. 2. 8vo. Paris, 1870. PURCHASED.

——. Natural History of Plants; translated by M.M. Hartog. Vol. 1. 8vo. London, 1871. Messrs. REEVE & Co.

——, Ed. Adansonia. See **Journals.**

Baker, *J. G.* See *von* **Martius.** Flora Brasil.

Balfour, *Edw.* The Timber Trees, timber, and fancy woods, as also the Forests, of India and of E. and S. Asia. 3rd ed. 8vo. Madras, 1870. SECRETARY OF STATE FOR INDIA.

Baruffaldi, *Girolamo.* Il Canapajo. 4to. Bologna, 1741. JAMES YATES, Esq., F.R. & L.S.

Bauer, *Ferd.* Illustrationes Floræ Novæ Hollandiæ: s. Icones Generum quæ in Prodromo Floræ Novæ Hollandiæ, &c., descripsit Robertus Brown. Nos. 1–3. Fol. Londini, 1813. J. J. BENNETT, Esq., V.P.L.S.

Baumhauer, *E. H. von.* Archives Neerl. &c. See ACADEMIES &c. **Haarlem,** Soc. Holl. d. Sc.

Beddome, *R. H.* The Ferns of Southern India: being descriptions and plates of the Ferns of the Madras Presidency. Pts. 1–20. 4to. Madras, 1863–64. D. HANBURY, Esq., F.R. & L.S.

Bennett, *Geo.* See **New S. Wales.** Silk, correspondence relating to.

Bentham, *George.* Flora Australiensis. Vol. 5 (Myoporineæ to Proteaceæ). 8vo. London, 1870. THE AUTHOR.

——. See *von* **Martius.** Flora Brasil.

Bethune, *C. J. S.*, Ed. See **Journals:** Canadian Entomologist.

Binney, *W. G.*, Ed. See **Gould,** *A. A.*

Blanchard, *Emile.* Discours lus aux séances tenues à la Sorbonne, en Avril, 1865, 1867, 1868, 1869, and 1870. 8vo. Paris, 1865–70.

——. Rapport sur les travaux scientifiques des Sociétés Savantes publiés en 1865. 8vo. (*Ibid.*, 1866.) G. BENTHAM, Esq., Pres. L.S.

Borre, *A. P. de.* Considérations sur la classification et la distribution géographique de la fam. des Cicindélètes. (Ann. Soc. Entom. Belg., tome 13.) 8vo. THE AUTHOR.

1871. G. BENTHAM, Esq., Pres. L.S.

Delpino, *Federico.* Ulteriori osservazioni sulla Dicogamia nel Regno Vegetale. Parte 2, fasc. 1. 8vo. Milano, 1870.

THE AUTHOR.

Dumas, —, Ed. Ann. Sc. Nat. See **Journals.**

Ehrenberg, *C. G.* Ueber machtige Gebirgs-Schichten vorherrschend aus mikroskopischen Bacillarien, unter und bei der Stadt Mexico. 4to. Berlin, 1869.

C. DARWIN, Esq., F.R. & L.S.

Eichler, *A. G.* Flor. Brasil. See *v.* **Martius.**

Eversmann, *E.* Natural History of the Birds of Orenbourg. (Rossicè). 8vo. Kazan, 1866–68. UNIVERSITY OF KAZAN.

Flower, *T. B.* Flora of Wiltshire. No. 13. 8vo. (Devizes.)

THE AUTHOR.

Frauenfeld, *Georg,* Ritter von. Die ausgestorbenen und aussterbenden Thiere der jungsten Erdperiode. 12mo. Wien, 1870.

——. Kurzer Bericht meines Ausfluges von Heiligenblut, uber Agram, an den Plattensee: mit Beschreibung einiger Metamorphosen und einer neuen Clausilia. 8vo. *Ibid.*, 1870.

TITLES. DONORS.

Frauenfeld, *G.* Ueber Vertilgung des Rapskäfers. 8vo. 1870.

——. Ueber den Wert der Vögel in bezug auf das Vogelschutzgesetz. 8vo. Wien. THE AUTHOR.

Funck, *H. C.* Cryptogamische Gewächse; besonders des Fichtelgebirgs. Heft 1–33. 4to. Leipzig, 1806–27.
JAMES YATES, Esq., F.R. & L.S.

Gervais, *Paul.* Cétacées des Côtes Françaises de la Méditerranée. (Comptes Rendus de l'Acad. Sc., tome 59.) 4to. Paris, 1864.

——. Nouvelles remarques sur les Poissons fluviatiles de l'Algérie. (*Ibid.*, tome 63.) 4to. *Ibid.*, 1866.
G. BENTHAM, Esq., Pres. L.S.

Gilbert, *J. H.* See **Masters,** *M. T.*

Gould, *Aug. A.* Report on the Invertebrata of Massachusetts. 2nd edition, edited by W. G. Binney. 8vo. Boston, 1870.
THE COMMONWEALTH OF MASSACHUSETTS.

Gould, *Nathaniel.* On the Pines of Canada. (From the Nautical Magaz., 1833.) 8vo. JAMES YATES, Esq., F.R. & L.S.

Günther, *A. C. L. G.*, Ed. Record of Zoological Literature, 1869. Vol. 6. 8vo. London, 1870. PURCHASED.

Haast, *Julius.* Moas and Moa Hunters: Anniversary Address delivered March 1, 1871, at the opening of the session of the Philosophical Institute of Canterbury, New Zealand. 8vo. Christchurch, 1871. THE AUTHOR.

Harvey, *W. H.* Phycologia Australica: or a History of Australian Sea-weeds. 5 vols. 8vo. London, 1858–63.
PURCHASED.

Hayden, *F. V.* Geological Report of the Exploration of the Yellowstone and Missouri Rivers, under the direction of Captain W. F. Raynolds, Engineers, 1859–60. 8vo. Washington, 1869.

——. Preliminary Field Report of the U. S. Geological Survey of Colorado and New Mexico. 8vo. *Ibid.*, 1869. THE AUTHOR.

Henfrey, *Arthur.* Elementary Course of Botany. 2nd Edition, by M. T. Masters, M.D., F.R. & L.S. 12mo. London, 1870.
PURCHASED.

Hörnes, M. Fossilen Mollusken, &c. See ACADEMIES &c. **Vienna,** Geol. R.-Anstalt.

Hoffmann, *Herm.* Ueber Kalk- und Salz-pflanzen. (Landw. Versuchsstationen, ed. Dr. F. Nobbe, Bd. 13.) 8vo. 1870.

——. St. Swithin and other Weather Saints. 8vo. *Ibid.*, 1871.
THE AUTHOR.

König, *Charles.* Icones Fossilium sectiles. Cent. 1. Sm. fol. (Londini, 1825.) J. J. BENNETT, Esq., V.P.L.S.

Kroyer, *H.*, Ed. Naturhist. Tidsskrift. See **Journals.**

Lange, *Joan.* Prodr. Floræ Hispan. See **Willkomm,** *M.*

Lawson, *Peter,* and Son. List of Plants of the Fir Tribe. Sm. 4to. Edinburgh, 1851. JAMES YATES, Esq., F.R. & L.S.

Lichtenstein, *J.* Maladie de la Vigne. See **Planchon,** *J. E.*

Linnæus, *Car.* Copies of various documents relating to his discovery of a mode of producing Artificial Pearls. (MS.)
MR. OSCAR DICKSON, OF GOTHENBURG.

Magnus, *P.* Beiträge zur Kenntniss der Gattung Naias, L. 4to. Berlin, 1870. C. DARWIN, Esq., F.R. & L.S.

Martius, *C. F. ab. de,* and **Eichler,** *A. G.*, Ed. Flora Brasiliensis. Fasc 49. Cyatheaceæ et Polypodiaceæ, a J. G. Baker. Fasc. 50. Swartzieæ et Cæsalpinieæ, a G. Bentham. Fol. Lipsiæ, 1870. PURCHASED.

Masters, *M. T.*, and **Gilbert,** *J. H.* Reports of experiments made in the gardens of the Royal Horticultural Society, at

TITLES. DONORS.

Chiswick, in 1869, on the influence of various manures on different species of plants. 8vo. London, 1870.
DR. MASTERS, F.R. & L.S.

Meyer, *Ad. Bernh.* Das Hemmungsnervensystem des Herzens. 8vo. Berlin, 1869. C. DARWIN, Esq., F.R. & L.S.

Meyer, *C. E. H.* von. Denkschrift von. See **Zittel,** *C. A.*

Michaux, *André.* Histoire des Arbres Forestiers de l'Amérique Septentrionale. Pins et Sapins. 8vo. Paris, 1810.

——. Noyers (Juglans). 8vo. *Ibid.*, 1811.
JAMES YATES, Esq., F.R. & L.S.

Miklos, *Sontag.* Az Erjedós és az Uj Gomba-Elmélet, &c. Pest, 1870.

Müller, *Erm.* Applicazione della Teoria Darwiniana ai Fiori ed agli Insetti, Visitatori dei Fiori. Versione del Tedesco e annotazioni di Fed. Delpino. (Bull. Soc. Entomol. Ital. vol. 2, 1870.) THE TRANSLATOR.

Nees von Esenbeck, *C. G.*, **Hornschuch,** *Fr.*, und **Sturm,** *Jac.* Bryologia Germanica: oder Beschreibung der in Deutschland und in der Schweitz wachsenden Laubmoose. Th. 1 & Th. 2, Abth. 1. 8vo. Nürnberg, 1825–27.
JAMES YATES, Esq., F.R. & L.S.

Netto, *Ladislau.* Additions à la Flore Brésilienne. Itinéraire Botanique dans la Province de Minas Geraes. 8vo. Paris, 1866.

——. Investigações historicas e scientificas sobre o Museu Imperial e Nacional do Rio de Janeiro. 8vo. Rio, 1870.

——. Apontamentos relativos á Botanica applicada no Brasil. 8vo. *Ibid.*, 1871. THE AUTHOR.

Packard, *A. S.* Record of Amer. Entomology. See ACADEMIES &c. **Salem, Mass.** Essex Institute.

Peschel, *Oscar.* Neu Probleme der vergleichenden Erdkunde als Versuch einer Morphologie der Erdoberfläche. 8vo, Leipzig, 1870. C. DARWIN, Esq., F.R. & L.S.

Planchon, *J. E.* La Phthiriose, ou Pédiculaire de la vigne chez les anciens, et les Cochenilles de la vigne chez les modernes. (Bull. Soc. d. Agri. 1870.) 8vo.

Planchon, *J. E.*, and **Lichtenstein,** *J.* Maladie de la Vigne, Conseils pratiques contre le Phylloxera. 8vo. Montpellier, 1870.

——. Maladie de la Vigne. Le Phylloxera. Instructions pratiques addressées aux Viticulteurs, &c, 8vo. *Ibid.*, 1870.
THE AUTHORS ?

ADDITIONS

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	TITLES.	DONORS.

ACADEMIES AND SOCIETIES.

Adelaide :—

Botanic Garden. See **Schomburgk,** *R.*

Philosophical Society.

Annual Report and Transactions for the year ending Sept. 30, 1870. 4to. Adelaide, 1871. — C. A. WILSON, Esq.

Amsterdam :—

Kon. Akademie van Wetenschappen.

Verhandelingen. Deel 12. 4to. Amsterdam, 1871.

Verslagen en Mededeelingen. Afdeeling Natuurkunde. 2[de] Reeks, 5[de] Deel. 8vo. *Ibid.*, 1871.

—— ——. Afd. Letterkunde. 2[de] Reeks, 1st Deel. 8vo. *Ibid.*, 1871.

Jaarboek voor 1870. 8vo. *Ibid.*

Processen-Verbaal van de gewone Vergaderingen der Akademie. 1870–71. Nos. 1–10. 8vo. *Ibid.* — THE ACADEMY.

Batavia:—

Bataviaasch Genootschap van Kunsten en Wetensch

Tijdschrift voor Indische Taal-, Land-, en Vo

Deel 19 Afl. 1–6. 8vo. Batavia, 1869–70.

Notulen van de Algemeene en Bestuurs-verg

Deel 7, Nos. 2–4, & Deel 8, Nos. 1 & 2. 8

1869–70. Th

Berlin:—

Kön. Akademie der Wissenschaften.

Abhandlungen, aus dem Jahre 1870. 4to. Berlin

Monatsberichte, für Jan.–Dec. 1871, & Jan. &

8vo. *Ibid.*, 1871–72. The

Botanischer Verein für die Provinz Brandenburg

angrenzenden Länder.

Verhandlungen, Jahrg. 9–12. redigirt von Dr. P.

8vo. *Ibid.*, 1867–70. The A

Verein zur Beförderung des Gartenbaues in den K

Staaten.

Wochenschrift, Jahrg. 14, 1871. 4to. Berlin. Th

Berwickshire:—

Naturalists' Club.

Proceedings. Vol. 6, No. 3. 8vo. (1871?).

Bogota:—

Exposicion Nacional del 20 de Julio, 1871.

TITLES. DONORS.

ACADEMIES AND SOCIETIES (*continued*).

Bogota (*continued*):—

Exposicion Nacional del 20 de Julio, 1871 (*continued*).

Catalogo de las Colleccioues mineralogica i jeologica, de Liborio **Zerda.** 8vo. *Ibid.*, 1871. THE EXHIBITION ?

Bonn:—

Naturhistorischer Verein der Preussischen Rheinlande, &c.

Verhandlungen, Jahrgang 27. 8vo. Bonn, 1870. THE ASSOCIATION.

Bordeaux:—

Société des Sciences Physiques et Naturelles.

Mémoires, Tome 6, cahiers 3 & 4, & Tome 8, cahiers 1 & 2. 8vo. Paris, 1868–72. THE SOCIETY.

Boston, Mass.:—

American Academy of Arts and Sciences.

Memoirs. New series, Vol. 10, part 1. 4to. Cambridge and Boston, 1868.

Proceedings. Vol. 8, sheets 18–37. 8vo. (Boston), 1869–70. THE ACADEMY.

Harvard College. See **Cambridge.**

Society of Natural History.

Memoirs. Vol. 2, part 1. 4to. (Boston), 1871.

Proceedings. Vol. 13, sheets 15–23. 8vo. 1869–70. THE SOCIETY.

Brandenburg:—

Botan. Verein. See **Berlin.**

Bremen:—

Naturwissenschaftlicher Verein.

Abhandlungen. Band 2, Heft 1 & 3, und Band 3, Heft 1. 8vo. Bremen, 1869–72.

Jahresbericht 6 & 7. 8vo. *Ibid.*, 1871–72.

Bericht über das Naturhistorische Cabinet und die Bibliothek des Museums. 8vo. *Ibid.*, 1871. THE ASSOCIATION.

Brünn:—

Naturforschender Verein.

Verhandlungen. Band 8, Heft 1 & 2. 8vo. Brünn, 1870. THE ASSOCIATION.

Annuaire. 37[e] année. 12mo. *Ibid.*, 1871.

Observations des phénomènes périodiques. 4to.

Tu

Société Entomologique Belge.

Annales. Tomes 1–14. 8vo. Bruxelles, 1857–'

T

Buenos Ayres :—

Museo Público.

Anales: por German Burmeister, M.D., &c
8 & 9. (Tomo 2, Entrega 2 & 3). 4to. Buenos A

T

Calcutta :—

Asiatic Society of Bengal.

Journal. New series. Vol. 40, part 2. 8vo. Cal

Proceedings. Nos. 3–13 for 1871, and No. 1
8vo. *Ibid.*, 1871–72. T

Cambridge, Mass. :—

Harvard College Museum of Comparative Zoology.

Annual Report of the Trustees; and Report of t
for 1870. 8vo. Boston, 1871.

Illustrated Catalogue of the Museum, No. 3.

TITLES. DONORS.

ACADEMIES AND SOCIETIES (*continued*).

Cherbourg :—

Société des Sciences Naturelles.

Mémoires. Tome 1, livr. 3 & 4, and Tome 15. (2ème Série, Tome 5). 8vo. Paris, &c., 1853–70.

Catalogue de la Bibliothèque de la Société. Partie 1. 8vo. Cherbourg, 1870. THE SOCIETY.

Christiania :—

Norwegian University. See **Blytt,** *A.*

Connecticut :—See **New Haven.**

Copenhagen :—

Botaniske Forening.

Botanisk Tidsskrift; redigeret af H. Kiærskou. Række 1, Bind 4, Hæfte 2 & 3; and Række 2, Bind 1, Hæfte 1. 8vo. Kjöbenhaven, 1870–72. PURCHASED.

Kongl. Danske Videnskabernes Selskab.

Skrifter. Naturvidensk. og mathem. Afdeling. Række 5, Bind 9, Hft 5. 4to. Kjöbenhavn, 1871.

Oversigt over det Kgl. D. V. S. Forhandlinger, &c. 1870, No. 3, and 1871, Nos. 1 & 2. 8vo. *Ibid.* THE SOCIETY.

Cornwall Polytechnic Society:—See **Falmouth.**

Devonshire :—

Association for the Advancement of Science.

Report and Transactions. Vol. 4, pt. 2. 8vo. Plymouth, 1871. THE ASSOCIATION.

Dresden :—

Academia Cæs. Germanica Naturæ Curiosorum.

Nova Acta (Verhandlungen). Tom. 35. 4to. Dresdæ, 1870. THE ACADEMY.

Dublin :—

Royal Dublin Society.

Journal. No. 40. 8vo. Dublin, 1872. THE SOCIETY.

Société de Physique et d'Histoire Naturelle.

Mémoires. Tome 21, partie 1. 4to. Paris & Bâle, 1871.

——. Table des Mémoires contenus dans les tomes 1 à 20. 4to. Genève, 1871. THE SOCIETY.

Göttingen :—

Königl. Gesellschaft der Wissenschaften.

Abhandlungen. Band 15 & 16. 4to. Gottingen, 1871–72.

Nachrichten, aus den Jahren 1870–71. 8vo. *Ibid.* THE SOCIETY.

Haarlem :—

Société Hollandaise des Sciences.

Archives Néerlandaises des Sciences Exactes et Naturelles. Tome 5, Livr. 4 & 5, et Tome 6, Livr. 1–5. 8vo. La Haye, 1870–71. THE SOCIETY.

Hague :—

Nederlandsche Entomologische Vereeniging.

Tijdschrift voor Entomologie. 2de Serie, Deel 6, Afl. 2–6. 8vo. Gravenhage, 1871. THE SOCIETY.

TITLES. DONORS.

ACADEMIES AND SOCIETIES (*continued*).

Hobart Town, V. D. Land :—

Royal Society of Tasmania.

Monthly Notices of Papers and Proceedings for 1870. 8vo. Hobart Town, 1871. THE SOCIETY.

India :—

Forest Reports.

Report on the Pyinkadoh (*Xylia dolabriformis*, Bth.) Forests of Aracan. Fcap. fol. Rangoon, 1870.

Report on Punjab Forest Administration for 1870–71. Fcap. fol. INDIA OFFICE.

Indiana :—

Geological Survey of. See **Cox,** *E. T.*

Innsbruck :—

Naturwissenschaftlich-medizinischer Verein.

Berichte. Jahrg. 1, Hft. 1 & 2, und Jahrg. 2, Hft. 1-3. 8vo. Innsbruck, 1870-72. THE ASSOCIATION.

Kazan :—

University.

Utchenia Zapiski. 1864, Nos. 1 & 2. 8vo. Kazan, 1865.

Izvestia i Utchenia Zapiski. 1868, Nos. 3–6. 8vo. *Ibid.*, 1870. THE UNIVERSITY.

Kew :—

Royal Gardens, Report on. See **Hooker,** *J. D.*

Königsberg :—

Kön. Physikal.-ökonom. Gesellschaft.

Schriften. Jahrg. 11, Abth. 1 & 2. 4to. Königsberg, 1870–71. THE SOCIETY.

Lausanne :—

Société Vaudoise des Sciences Naturelles.

Bulletin. Nos. 63–67. 8vo. Lausanne, 1870–72. THE SOCIETY.

Leyden :—

Nederlandsche Botanische Vereeniging.

Nederlandsch Kruidkundig Archief; onder redactie van Dr. W. F. R. Suringar, &c. 2de Serie, Deel 1, Stuk 1. 8vo. Nijmegen, 1871. THE ASSOCIATION.

London.

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7. Hand-list of Genera and Species of Birds. By G. R. Gray, F.L.S. &c. Parts 1–3. 8vo. 1869–71.
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ACADEMIES AND SOCIETIES (*continued*).

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TITLES. DONORS.

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British Museum (*continued*).

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Clinical Society.

Transactions. Vol. 4. 8vo. London, 1871. THE SOCIETY

Entomological Society.

Transactions. Pts. 1–5 for 1871, and Pts. 1 & 2 for 1872. 8vo. London, 1871–72. THE SOCIETY.

Geological Society.

Quarterly Journal. Vol. 27, Pts. 3 & 4, and Vol. 28, Pts. 1 & 2. 8vo. London, 1871–72. THE SOCIETY.

London Institution.

Journal. Nos. 7–15. 8vo. London, 1871–72.

THE INSTITUTION.

Palæontographical Society's publications. Vol. 25. 4to. London, 1872; containing:—

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5. **Woodward,** *H.* Fossil Merostomata. Pt. 3.

PURCHASED.

Pharmaceutical Society.

Pharmaceutical Journal and Transactions. 3rd Series, Nos. 51–103. 8vo. London, 1871–72.

Calendar for 1872. 8vo. *Ibid.*, 1872. THE SOCIETY.

Quekett Microscopical Club.

Journal. No. 15–18. 8vo. London, 1871–72.

Report, 6th, and List of Members. 8vo. *Ibid.*, 1871.

THE CLUB.

Ray Society. See **Allman,** *G. J.*

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Philosophical Transactions. Vol. 161, Pts. 1 & 2. 4to. London, 1871.

TITLES. DONORS.

ACADEMIES AND SOCIETIES (*continued*).

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Zoological Society.

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Proceedings. Pts. 1–3 for 1871. 8vo. *Ibid.*, 1871.

THE SOCIETY.

Lund:—

Universitet.

Års-skrift. (Acta) för 1870. Mathematik och Naturvetenskap. 4to. Lund, 1870–71.

THE FYSIOGRAFISKA SÄLLSKAPET, LUND.

Lyon:—

Académie Imp. des Sciences.

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Société Imp. d'Agriculture, Histoire Naturelle, &c.

Annales. 4me Série, Tome 1. 8vo. Lyon, 1869.

THE SOCIETY.

Maine, U. S.:—

Report for 1870 of the Commissioners of Fisheries of the State of Maine. 8vo. Augusta, 1870.

PORTLAND SOC. NAT. HIST., MAINE.

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Literary and Philosophical Society.

Proceedings. Vol. 11, Nos. 1–13. 8vo. 1871–72.

THE SOCIETY.

Melbourne:—See **Victoria.**

Montpelier:—

Botanic Garden.

Index Seminum Horti Monspeliensis, Anno 1871. 4to.

C. MARTINS, HORT. PRÆF.?

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Botanic Garden. See **Regel,** *E.*

Société Imp. des Naturalistes.

Nouveaux Mémoires. Tome 13, Livr. 3. 1871.

Bulletin. Tome 43, Nos. 3 & 4, Tome 44, N *Ibid.*, 1871–72.

Munich:—

Kön. Bayerische Academie der Wissenschaften.

Sitzungsberichte. 1870. Band 2, Hft. 2, 3, Mathem-physikal. Classe. 1871. Hft. 1 & 2 chen, 1870–71.

Almanach für das Jahr 1871. 12mo. *Ibid.*

T

Newcastle-on-Tyne:—

Natural History Society of Northumberland and

Transactions. Vol. 4, Pt. 1. 8vo. London, &

New Haven, Connecticut:—

Academy of Arts and Sciences.

Transactions. Vol. 1, Pt. 2, and Vol. 2, Pt. 1 Haven, 1867–71. T

TITLES. DONORS.

ACADEMIES AND SOCIETIES (*continued*).

Orleans, Vermont :—

County Society of Natural Sciences.

Archives of Science &c. Vol. 1, Nos. 1–3. 8vo. Newport, Orleans Co., Vermont, 1870–71. THE SOCIETY.

Paris :—

Société Botanique de France.

Bulletin. Tome 17, Revue Bibl. D, Comptes Rendus des Séances, No. 3. 8vo. Paris, 1870–71, and Tome 18, Comptes Rendus des Séances, No. 1, and Revue Bibl. C.

Bulletin. Tome 17, Session extraordinaire à Autun-Givry, Juin, 1870. 8vo. Paris, 1871.

Rapport par M. A. Delondre sur le Bombardement du Muséum d'Histoire Naturelle, par l'armée Allemande, en Janvier, 1871. 8vo. *Ibid.* THE SOCIETY.

Institut de France.—Académie des Sciences.

Mémoires. Tomes 29, 32, 34, 35, 36, & 37. 4to. Paris, 1864–70.

Mémoires présentés par divers Savants. Math. & Phys. Tomes 18 & 19. 4to. *Ibid.*, 1865–68. THE INSTITUTE.

Muséum d'Histoire Naturelle.

Nouvelles Archives. Tome 4, Fasc. 3 & 4, et Tome 5, Fasc. 1–4. 4to. Paris, 1868–69. THE MUSEUM.

Société Entomologique de France.

Annales. 4e Série, Tome 10, and Partie supplémentaire (Monographie de la famille des Eucnémides, par le Victor H. de Bonvouloir). 8vo. Paris, 1870–71.

——. 5e Serie, Tome 1. 8vo. *Ibid.*, 1871.

THE SOCIETY.

Petersburg :—

Académie Imp. des Sciences.

Mémoires. 7e Serie, Tome 16, & Tome 17, Nos. 1–10. 4to. St. Pétersburg, 1870–71.

Bulletin. Tome 15, Nos. 3–5, and Tome 16, Nos. 1–6. 4to. *Ibid.*, 1870–71. THE ACADEMY.

Petropoli, 1870–71.

Philadelphia :—

Academy of Natural Sciences.

Proceedings. Nos. 1–3 for 1870. 8vo. Philad

American Journal of Conchology. Vol. 6, Pt

Ibid., 1870–71. T

American Philosophical Society.

Proceedings. Nos. 83–87. 8vo. Philadelphia,

Transactions. New Series. Vol. 14, Pts. 1

Ibid., 1870–71.

Plymouth :—

Plymouth Institution and Devon and Cornwall Nat

Society.

Annual Report and Transactions. Vol. 4, Pt. 2

mouth, 1871.

Portland, Maine. Nat. Hist. Soc :—See **Maine**

Regensburg :—

TITLES. DONORS.

ACADEMIES AND SOCIETIES (*continued*).

Rugby :—

Rugby School Natural History Society.

Report for the year 1871. 8vo. Rugby, 1872.

F. E. KITCHENER, Esq., F.L.S.

Salem, Mass. :—

Essex Institute.

Bulletin. Vol. 2, Nos. 1–12. 8vo. Salem, Mass., 1870.

Proceedings and Communications. Vol. 6, Pt. 2 (1868–71). 8vo. *Ibid.*, 1871.

Record of Entomology for the year 1869. Edited by A. S. Packard, Jun., M.D. 8vo. *Ibid.*, 1870. THE INSTITUTE.

Peabody Academy of Science.

American Naturalist. Vol. 4, Nos. 3–12, and Vol. 5, No. 1. 8vo. Salem, Mass., 1870–71.

Annual Reports (2nd & 3rd) of the Trustees for 1869 & 70. 8vo. *Ibid.*, 1871. THE ACADEMY.

Stockholm :—

Kongl. Svenska Vetenskaps-Akademien. See **Fries,** *Elias.*

Sydney :—

Entomological Society of New South Wales.

Transactions. Vol. 2, Pts. 2 & 3. 8vo. Sydney, 1871.

THE SOCIETY.

Toronto :—

Canadian Institute.

Canadian Journal of Science, Literature, and History. New Series. Nos. 74 & 75 (=Vol. 13, Nos. 2 & 3). 8vo. Toronto, 1871–72. THE INSTITUTE.

Turin :—

R. Accademia delle Scienze.

Atti. Vol. 6, Dispensa 1–7. 8vo. Torino, 1870–71.

Memorie. Serie 2, Tomo 25 e 26. Scienze Fisiche e Matematiche. 4to. *Ibid.*, 1871.

TITLES. DONORS.

ACADEMIES AND SOCIETIES (*continued*).

Washington:—

Smithsonian Institution.

Smithsonian Contributions to Knowledge. Vol. 17. 4to. Washington, 1871.

Annual Report of the Board of Regents for 1869. 8vo. *Ibid.*, 1871. THE INSTITUTION.

Wiesbaden:—

Nassauischer Verein für Naturkunde.

Jahrbücher. Jahrg. 23 & 24. (=**Fückel,** *L.*, Symbolæ Mycologicæ. Beiträge zur Kenntniss der Rheinischen Pilze.) 8vo. Wiesbaden, 1869–70. THE ASSOCIATION.

Woolhope:—

Naturalists' Field Club.

Transactions for 1869 & 70. 8vo. Hereford, 1870–71. GEORGE BENTHAM, Esq., Pres. L.S.

Würzburg:—

Physikalisch-Medicinische Gesellschaft.

Verhandlungen. Neue Folge. Bd. 2, Hft. 1–4. 8vo. Würzburg, 1871–72. THE SOCIETY.

Zürich:—

Naturforschende Gesellschaft.

Vierteljahrsschrift. Jahrg. 14 & 15. 8vo. Zürich, 1869–70. THE SOCIETY.

Journals:—

Annales des Sciences Naturelles. 5me Série. Zoologie. Tomes 11–14. Botanique. Tomes 11–13, and Tome 14, Nos. 1–4. 8vo. Paris, 1869–72. PURCHASED.

Annals and Magazine of Natural History. 4th Series, Nos. 43–54. 8vo. London, 1871–72. DR. FRANCIS, F.L.S. &c.

Archiv für Mikroskopische Anatomie; herausgegeben von Prof. Max Schultze. Bd. 6 & 7. 8vo. Bonn, 1870–71. PURCHASED.

Archiv für Naturgeschichte; gegründet von A. F. A. Wiegmann; fortgesetzt von W. F. Erichson &c. Jahrg. 36, Hft. 5 & 6, und Jahrg. 37, Hft. 1–3. 8vo. Berlin, 1870–71. PURCHASED.

Entomologist's Monthly Magazine: conducted by H. G. Knaggs, M.D., R. M'Lachlan, Esq. &c. Nos. 86–97. 8vo. London, 1871–72. THE EDITORS.

Flora. See ACADEMIES, **Regensburg.**

Gardeners' Chronicle and Agricultural Gazette. Nos. 24–52 for 1871, and Nos. 1–24 for 1872. 4to. London.
PURCHASED.

Geological Magazine: edited by Henry Woodward, F.G.S. &c. Vol. 8, Nos. 7–12, and Vol. 9, Nos. 1–6. 8vo. London, 1871–72. THE EDITOR.

Giornale (Nuovo) Botanico Italiano: diretto da Od. Beccari e T. Caruel. Vol. 3, Nos. 3 & 4, and Vol. 4, Nos. 1 & 2. 8vo. Firenze e Pisa, 1871–72. THE EDITOR.

Ibis. 3rd Series: edited by Osbert Salvin, M.A., F.L.S. (Vol. 1.) Nos. 3 & 4, and (Vol. 2) Nos. 5 & 6. 8vo. London, 1871–72.
PURCHASED.

Jahrbücher für wissenschaftliche Botanik: herausgegeben von Dr. N. Pringsheim. Band 8, Hft. 1–3. 8vo. Leipzig, 1871–72. PURCHASED.

TITLES. DONORS.

Journals (*continued*):—

Journal de Conchyliologie; publié sous la direction de MM. Crosse et Fischer. 3e Série, Tome 10, No. 4, Tome 11 & Tome 12, Nos. 1 & 2. 8vo. Paris, 1870–72. PURCHASED.

Journal of Botany, British and Foreign: edited by Berthold Seemann, Ph.D., F.L.S., &c., H. Trimen, M.B., F.L.S., and J. G. Baker, F.L.S. Nos. 103–114. 8vo. London, 1871–72. PURCHASED.

Linnæa: ein Journal für die Botanik: herausgegeben von Dr. Aug. Garcke. Neue Folge, Bd. 3, Heft 2. 8vo. Berlin, 1872. PURCHASED.

Malakozoologische Blätter; als Fortsetzung der Zeitschrift für Malakozoologie; herausgegeben von Dr. Louis Pfeiffer. Band 18, Bogen 4–15, und Bd. 19, Bog. 1–6. 8vo. Cassel, 1871–72. PURCHASED.

Monthly Microscopical Journal. See ACADEMIES, **London,** R. Microscopical Society.

Nature: a weekly illustrated Journal of Science. Nos. 85–137. 8vo. London, 1871–72. THE PUBLISHER.

Nederlandsch Kruidkundig Archief. See ACADEMIES, **Leyden,** Nederl. Botanische Vereeniging.

Nuovo Giornale. *See* Giornale.

Pharmaceutical Journal. See ACADEMIES, **London,** Pharmaceutical Society.

Philosophical Magazine and Journal of Science. 4th Series, Nos. 277–82. 8vo. London, 1871. DR. FRANCIS, F.L.S. &c.

Popular Science Review: edited by Henry Lawson, M.D. Nos. 40–43. 8vo. London, 1871–72. R. HARDWICKE, Esq., F.L.S.

Revue Scientifique. 2e Série, Nos. 24 & 25. 4to. Paris, 1871. THE EDITOR.

Zeitschrift für wissenschaftliche Zoologie: herausgegeben von C. T. von Siebold und Albert Kölliker. Bd. 21, Hft. 2–4, and Bd. 22, Hft. 1 & 2. 8vo. Leipzig, 1871–72. PURCHASED.

Zoological Record for 1870. See **Newton,** *Alfred*.

Zoologist: edited by Edward Newman, F.L.S. &c. 2nd Series, Nos. 70–81. 8vo. London, 1871–72. PURCHASED.

TITLES. DONORS.

Baillon, *H.* Histoire des Plantes. Tome 3, Familles 13–18, et Tome 4, Fam. 24–6. 8vo. Paris, 1871–72. PURCHASED.

Baker, *J. G.*, Ed. See Journal of Botany.

Balderrama, *Jenaro.* Ensayo descriptivo de las Palmas de San Martin i Casanare. 8vo. Bogota, 1871. THE AUTHOR?

Balfour, (*J. H.*). On the variation, at different seasons, of a *Hieracium* considered to be *H. stoloniferum*, Waldst. and Kit. (Trans. Bot. Soc. Edinb., Vol. 11.) 8vo. THE AUTHOR.

——. Obituary Notice of Thomas Anderson, M.D., F.L.S. (Trans. Bot. Soc. Edinb., 1870–71.) 8vo. THE AUTHOR.

Beccari, *O.*, Ed. Giornale Bot. Ital.

Bennett, *George.* On the introduction, cultivation, and œconomic uses of the Orange, and others of the Citron-tribe, in New South Wales. 8vo. (Sydney?, 1871.) THE AUTHOR.

Bethune, *Rev. J. S.*, Ed. See **Journ.,** Canadian Entomologist.

Blytt (*A.*). Christiania omegns Phanerogamer og Bregner, med angivelse af deres Udbredelse. 8vo. Christiania, 1870.
R. NORWEGIAN UNIVERSITY, CHRISTIANIA.

Bonvouloir, *H.*, Vicomte de. Monographie de la famille des Eucnemides. See ACADEMIES, **Paris,** Soc. Entomol.

Borckhausen, *M. B.* Botanisches Wörterbuch; vermehrt von Dr. F. G. Dietrich. 2 Bände. 8vo. Giessen, 1816. PURCHASED.

Brady, *Charles.* On the Ailant Silkworm. 8vo. Sydney, 1868.

——. Silk. 8vo. *Ibid.?* (1871). DR. GEORGE BENNETT, F.L.S.

Bretschneider, *E.* On the study and value of Chinese Botanical Works; with notes on the history of plants and geographical Botany, from Chinese sources. 8vo. Foochow (1870).

——. On the knowledge possessed by the ancient Chinese of the Arabs and Arabian Colonies and other Western Countries. 8vo. London, 1871. THE AUTHOR.

Britten (*James*). Contributions to a Flora of Berkshire. (Trans. Newb. Dist. Field Club.) 8vo. (1871.) THE AUTHOR.

Bronn, *H. G.* Klassen und Ordnungen des Thierreichs, wissenschaftlich dargestellt in Wort und Bild. Bd. 1, Bd. 2, Bd. 3, Lief. 1 & 2, Bd. 5, Lief. 1–16, and Bd. 6, Abth. 4, Lief. 1–6. 8vo. Leipzig und Heidelberg, 1860–70. PURCHASED.

Brown, *Robert.* Die Geographische Verbreitung der Coniferen und Gnetaceen. (Petermann's Geogr. Mitth., 1872, Hft. 2.) 4to. THE AUTHOR.

berg, 1863. PURCHASED.

Clemens, Dr. *Brackenridge.* Tineina of North America; with notes by the Editor, H. T. Stainton, F.R.S., Sec. L.S. 8vo. London, 1872. THE EDITOR.

Cooke, *M. C.* Handbook of British Fungi. 2 Vols. 12mo. London &c., 1871. THE AUTHOR.

Cox, *E. T.* First Annual Report of the Geological Survey of Indiana. 8vo. Indianopolis, 1869. (With Maps and coloured section.) THE AUTHOR.

Dawson, *J. W.* The Fossil Plants of the Devonian and Upper Silurian formations of Canada. 8vo. Montreal, 1871. THE AUTHOR.

Day, *Francis.* Report on the Fish and Fisheries of the Fresh Waters of India. 8vo. Simla, 1871.

——. On Buchanan Hamilton's original drawings of Fish in the Library of the Asiatic Society of Bengal. (Proc. As. Soc. for Sept. 1871.) 8vo. THE AUTHOR.

Delpino, *Federigo.* Studi sopra un Lignaggio Anemofilo delle

TITLES. DONORS.

Composte; ossia, sopra il gruppo delle Artemisiacee. 8vo. Firenze, 1871. THE AUTHOR.

Dietrich, *Albert.* Flora Marchica; oder Beschreibung der in der Mark Brandenburg wildwachsenden Pflanzen. 12mo. Berlin, 1841. PURCHASED.

Duchartre, *P.* Observations sur le genre Lis (*Lilium*, Tourn.). 8vo. Paris, 1870. THE AUTHOR.

Eichler, *A. G.* Flora Brasil. *v.* **Martius,** *C. F. P.*

Eisengrein, *G. A.* Die Familie der Schmetterlingsblüthigen oder Hülsengewächse; mit besonderer Hinsicht auf Pflanzenphysiologie. 8vo. Stuttgart and Tübingen, 1836. PURCHASED.

Engelmann, *Georg.* Icones Florum Antholyticorum. 8vo. Francofurti ad Mœnum, 1832. PURCHASED.

Engler, Dr. *A.* Monographie der Gattung Saxifraga. 8vo. Breslau, 1872. PURCHASED.

Ferrière, *Emile.* Le Darwinisme. 12mo. Paris, 1872. C. DARWIN, Esq., F.R. & L.S.

Frauenfeld, *Georg,* Ritter von. Die Pflege der Jungen bei Thieren. 12mo. Wien, 1871.

——. Der Vogelschutz. (Verh. d. K. K. Zool.-Bot. Ges., 1871.) 8vo.

——. Die Grundlagen des Vogelschutzgesetzes. 8vo. Wien, 1871. THE AUTHOR?

Fries, *Elias.* Icones selectæ Hymenomycetum nondum delineatorum (sub ausp. Reg. Acad. Scient. Holmiensis editæ). Fasc. 1–6. Fol. Holmiæ, 1867–70? THE ACADEMY OF SCIENCES, STOCKHOLM.

Fückel, *L.* Rheinische Pilze. See ACADEMIES &c., **Wiesbaden,** Nassauischer Verein.

Gilibert, *J. E.* Histoire des plantes d'Europe et étrangères; ou Élémens de Botanique Pratique. 2de édition. 3 Tomes. 8vo. Lyon, 1806. PURCHASED.

Goeppert, *H. R.* Uebersicht der fossilen Flora Schlesiens. See **Wimmer,** *F.*

Grabowski, *Heinrich.* Flora von Oberschlesien und dem Gesenke. 8vo. Breslau, 1843. PURCHASED.

Gray, *J. E.* Synopsis of the species of Starfish in the British Museum. (With figures of some of the new species.) 4to. London, 1866. PURCHASED.

Hoffmann, *H.* Ringelungsversuche. (Allgem. Forst- und Jagd-Zeitung.) 4to. 1871. ½ sheet.

——. Hexenbesen der Kiefer. (*Ibid.*) 4to. ½ sheet.

——. Einfluss der Bodenbeschaffenheit auf die Vegetation. (Neue Landwirthsch. Zeitung, Jahrg. 21.) 8vo. Glogau, 1871?

——. Ueber Holzschwamm und Holzverderbniss. (Allgem. Forst- und Jagd-Zeitung, 1872.) 4to.

——. Ueber Aufbewahrung Mikroskopischer Präparate. (Verh. K. K. Zool.-Bot. Ges. in Wien, 1871.) 8vo. THE AUTHOR.

Hoffmann, *Hermann.* Mykologische Berichte. 3. für 1871. 8vo. Giessen, 1872. PURCHASED.

Hogg, *Jabez.* On Gnat's Scales. (M. Microsc. Journ., 1871.) 8vo.

——. Mycetoma: the Fungus-foot disease of India. (*Ibid.*, 1872.) THE AUTHOR.

Hooker, *J. D.* Report on the progress and condition of the Royal Gardens, Kew, during the year 1870. 8vo. London, 1871. THE AUTHOR.

——, Ed. See **Journals,** Botanical Magazine.

TITLES. DONORS.

Hutton, (*F. W.*). Catalogue of the Birds of New Zealand, with diagnosis of the species. 8vo. Wellington, N. Z., 1871. THE AUTHOR?

Jones, *T. R.* See **Parker,** *W. K.*

Kirby, *W. F.* Synonymic Catalogue of Diurnal Lepidoptera. 8vo. London, 1871. PURCHASED.

Krempelhuber, (*A. von*). Geschichte und Literatur der Lichenologie. Bd. 3. 8vo. München, 1872. PURCHASED.

Künstler, *Gustav.* Die unseren Kulturpflanzen schädlichen Insekten. 8vo. Wien, 1871. THE AUTHOR?

Kurz, *Salpig.* On some new or imperfectly known Indian Plants. (Journ. As. Soc. Beng. Vols. 39 & 40.) 8vo. (Calcutta), 1870–71.

——. Gentiana Jæschkei reestablished as a new genus (*Jæschkea*) of Gentianeæ. (*Ibid.*, Vol. 39.) 8vo. 1870. THE AUTHOR.

Leighton, Rev. *W. A.* Lichen-Flora of Great Britain, Ireland, and the Channel Islands. 12mo. Shrewsbury, 1871.

——. ——. 2nd edition. 12mo. *Ibid.*, 1872. THE AUTHOR.

Letellier, *J. B. L.* Figures des Champignons; servant de Supplément aux planches de Bulliard. Livr. 1–18. 4to. Paris, 1836. PURCHASED.

Lewis, *W. A.* Discussion on the Law of priority in Entomological Nomenclature; with strictures on its modern application. 8vo. London, 1872. THE AUTHOR.

Lindberg, *S. O.* Plantæ nonnullæ Horti Botanici Helsingforsiensis. Ex Act. Soc. Scient. Fennic. x.) 4to. Helsinforsiæ, 1871.

——. Revisio critica Iconum in opere 'Flora Danica' Muscos illustrantium. (*Ibid.*) 4to. *Ibid.*, 1871. THE AUTHOR.

Lindsay, *W. L.* The Physiology and Pathology of Mind in the Lower Animals. 8vo. Edinburgh, 1871. THE AUTHOR.

Loew, *H.* Europ. Dipteren. See **Meigen,** *J. W.*

Lowe, *Richd. Thos.* Manual Flora of Madeira and the adjacent islands of Porto Santo and the Desertas. Vol. 2, part 1. 12mo. London (1872?). THE AUTHOR.

Lyell, *R. M.* Geographical Handbook of all the known Ferns; with tables to show their distribution. 8vo. London, 1870. G. BENTHAM, Esq. Pres. L.S.

Martins, *Charles.* Observations sur l'origine glaciaire des Tourbières du Jura Neuchatelois, et de la végétation spéciale qui les caractérise. 4to. Montpellier, 1871.

TITLES. DONORS.

Newton, *Alfred*, Ed. Record of Zoological Literature for 1870. Vol. 7. 8vo. London, 1871. PURCHASED.

Nowicki, Dr. *Max.* Ueber die Weitzenverwüsterin, *Chlorops tæniopus*, Meig., und die Mittel zu ihrer Bekämpfung. 8vo. Wien, 1871. THE AUTHOR?

Oliver, *Daniel.* Flora of Tropical Africa. Vol. 2. 8vo. London, 1871. H.M. OFFICE OF WORKS.

Packard, *A. S.*, Ed. Record of American Entomology. See ACADEMIES, **Salem.**

Parker, *W. K.*, **Jones,** *T. R.*, &c. On the Nomenclature of the Foraminifera. (Ann. Nat. Hist. for Sept. 1871.) 8vo. THE AUTHORS.

Parry, Major, *F. J. S.* Catalogue of Lucanoid Coleoptera. (Trans. Entom. Soc., 3rd Ser., Vol. 2.) 8vo. 1864. and

——. Revised do.; with Remarks on the Nomenclature. Part 1 (*Ibid.*, 1870.) 8vo. THE AUTHOR.

Pasquale, *Gius. Ant.* Documenti Biografici di Giovanni Gussone, Botanico Napolitano. 4to. Napoli, 1871.

——. Su di un ramo mostruoso della Opuntia fulvispina. 4to. *Ibid.*, 1871. THE AUTHOR.

——. Di alcuni effetti della caduta di cenere sulle piante, nell' ultima eruzione Vesuviana, osservati in Napoli. (Rendic. della R. Accad. delle Scienze, fis. e matem., fasc. 5, 1872.) 4to. (Napoli ?) THE AUTHOR ?

Pfeiffer, *Louis.* Flora von Nieder-Hessen und Münden. Neue Ausgabe. 2 Bände. 12mo. Kassel, 1855. PURCHASED.

Planchon, *J. E.* Des limites naturelles des Flores, et en particulier de la Florule locale de Montpellier. 8vo. Montpellier, 1871. G. BENTHAM, Esq., Pres. L.S.

Planchon, *J. E.*, & **Lichtenstein,** *J.* Maladie de la Vigne. Le Phylloxera. Instructions pratiques sur la manière d'observer la maladie, &c. 8vo. Montpellier, 1870.

——, ——. Conseils sur le traitement des vignes atteintes du Phylloxera. (Messager du Midi.) 8vo. 1871.

——, ——. Le Phylloxera de la Vigne en Angleterre et en Irlande. 8vo. Montpellier, 1871.

——, ——. Le Phylloxera. Faits acquis et revue bibliographique. 8vo. *Ibid.*, 1872. G. BENTHAM, Esq., Pres. L. S.

Reichard, *Joan. Jac.* Flora Mœnofrancofurtana. Partes 2. 8vo. Francof. ad Mœnum, 1772–78. PURCHASED.

Riley, *C. V.* Third Annual Report, on the Noxious, Beneficial, and other Insects of the State of Missouri. 8vo. Jefferson City, Mo., 1871. THE AUTHOR.

Ross, *Alex. M.* Catalogue of Birds, Insects, and Squirrels collected in the vicinity of Toronto, Canada. 8vo. Toronto, 1871. THE AUTHOR.

Rossbach, Dr. *M. J.* Die Rhythmischen Bewegungserscheinungen der einfachsten Organismen, und ihr Verhalten gegen Physikalische Agentien und Arzneimittel. 8vo. Wurzburg, 1872. THE AUTHOR?

Roth, *Alb. Guil.* Novæ Plantarum species, præsertim Indiæ Orientalis, ex coll. Dr. Benj. Heynii. 8vo. Halberstadii, 1821. PURCHASED.

Salvin, *Osbert,* Ed. Ibis. See **Journals.**

San Giorgio, *La Contessa di.* Catalogo poliglotto delle piante. 8vo. Firenze, 1870. G. BENTHAM, Esq., Pres. L. S.

TITLES. DONORS.

Saunders, *Edward.* Catalogus Buprestidarum synonymicus et systematicus. 8vo. London, 1871. THE AUTHOR.

Saunders, *W. W.*, Ed. Refugium Botanicum. Vol. 4, pt. 3, and Vol. 5, pt. 1. 8vo. London, 1871. THE EDITOR.

Savi, *Paolo.* 'Alla memoria di.' *Anon.*

Schomburgk, *Richard.* Catalogue of the plants under cultivation in the Government Botanic Garden, Adelaide, S. A. 8vo. Adelaide, 1871. THE AUTHOR.

——. ——. Another copy, presented by C. A. WILSON, Esq.

——. The culture of Tobacco. 8vo. Adelaide, 1872.

——. Report as Director of the Adelaide Botanic Garden. 1871. Fcap. fol. *Ibid.*, 1872. THE AUTHOR.

Schultes, *J. A.* Œsterreichs Flora; ein Handbuch auf botanischen Excursionen. 2te Auflage, 2 Theile. 12mo. Wien, 1814. PURCHASED.

Schultze, *Max,* Ed. Archiv für Mikroskop. Anat. See **Journals.**

Seidlitz, *Georg.* Die Darwinsche Theorie. Elf Vorlesungen über die Entstehung der Thiere und Pflanzen durch Naturzüchtung. 8vo. Dorpat, 1871. C. DARWIN, Esq., F.R. & L.S.

Shortt, *John.* The Hill Ranges of Southern India. Parts 2 & 3. 8vo. Madras, 1870–71.

——. The Cobra. (Madras Journ. of Med. Sci.) 8vo.

——. Brief account of the Tusseh Silkworm; with drawings of the Insect. (*Ibid.*) 1871. 8vo. THE AUTHOR.

Smith, *J. E.*, & **Sowerby,** *James.* English Botany. 3rd edition; by J. T. Boswell Syme, LL.D., F.L.S., &c. Nos. 81–83. 8vo. London, 1871–72.

The Publisher, ROBERT HARDWICKE, Esq., F.L.S.

Sowerby, (*G. B.*). Thesaurus Conchyliorum. Parts 29 & 30. 8vo. London, 1870–71. PURCHASED.

Thorell, *T.* Remarks on synonyms of European Spiders. No. 2. 8vo. Upsala, &c. (1871). THE AUTHOR.

Trimen, *Henry,* Ed. See Journal of Botany.

Visiani, *Rob. de.* Floræ Dalmaticæ supplementum. 4to. Venetiis, 1872. THE AUTHOR.

nebst einer Uebersicht der Fossilen Flora Schlesiens, von H. R. Göppert. 12mo. Breslau, 1845. PURCHASED.

Wright, *Chauncey.* Darwinism; being an Examination of Mr. St. George Mivart's 'Genesis of Species.' 8vo. London, 1871.
C. DARWIN, Esq., F.R. & L.S.

——. The uses and origin of the arrangements of leaves in plants. 4to. 1871. THE AUTHOR.

Zerda, *Liborio.* Catalogo de las Colleccione mineralogica e jeologica. 8vo. Bogota, 1871. THE AUTHOR.

Anon. :—

Alla memoria di Paolo Savi. 8vo. Pisa, 1871.
THE PRESIDENT.